MODERN PLASTICS

JANUARY 1951

YOU may telescope the distance from blueprint to sales

...by calling on your plastics molder's know-how

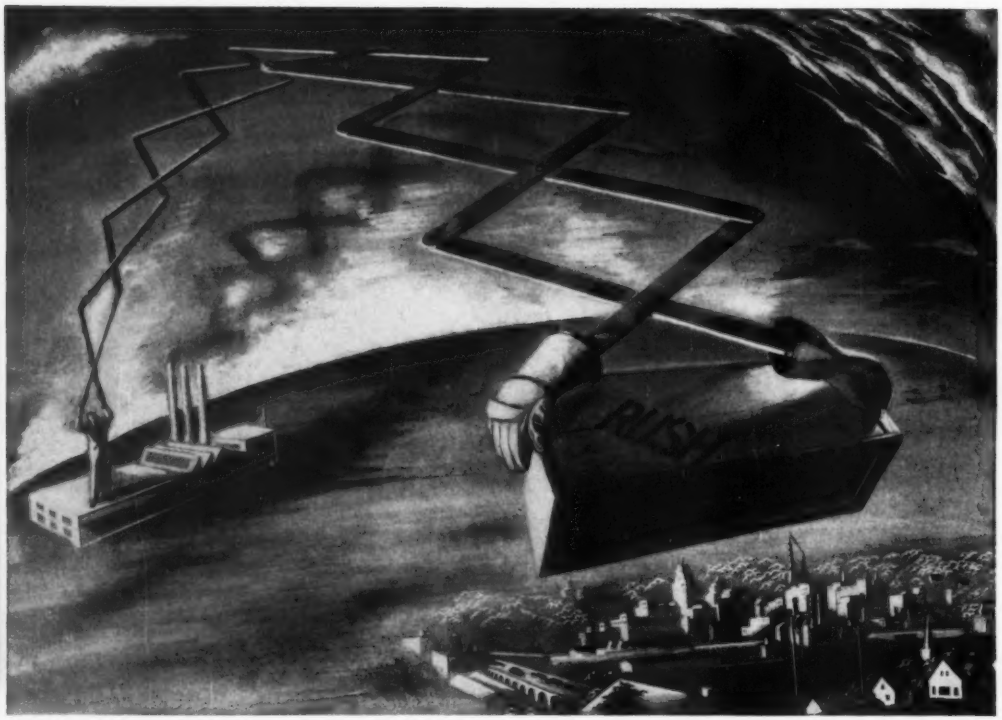


Figure it every way—in time, tooling costs, manpower need—there's a lot you may save by talking things over with a custom molder of Durez plastics.

Your molder can often see an opportunity to use plastics that is not apparent on the surface. Representing a mature industry, he is equipped to take hold on jobs involving plastics alone or in conjunction with other materials, and carry them through to completion with time-saving dispatch.

Accustomed to serving leading manufacturers in many fields, molders maintain highly competent design, engineering and production staffs. They hasten to adopt the newest in equipment and methods in the interest of low delivered cost.

Perhaps most valuable of all is the knowledge of plastic materials your molder uses in interpreting your needs. When resistance to heat, moisture, or chemicals is required, plus impact strength, unusual electrical properties, and high surface lustre, he recognizes the advantages of Durez phenolics. Because he knows them well, he can specify the one that best fits the job.

All the assistance the Durez staff can lend you and your molder in furthering your product plans will be given gladly. Offices in leading cities.

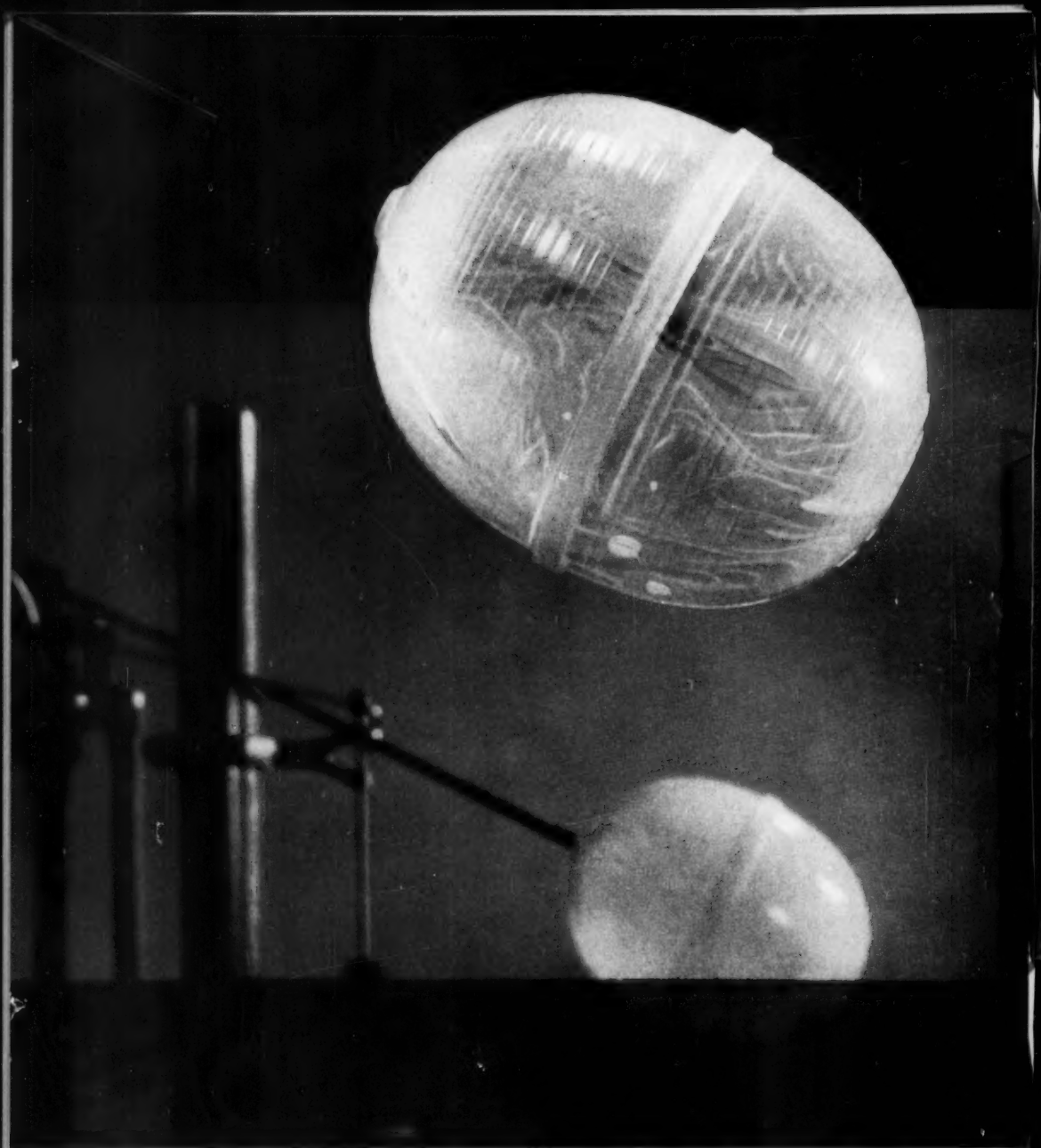
Our monthly "Durez Plastics News" will keep you informed on industry's uses of Durez. Ask us to send a copy regularly. Durez Plastics & Chemicals, Inc., 1201 Walck Road, North Tonawanda, N. Y.

DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC PLASTICS THAT FIT THE JOB



Catalin
STYRENE
is *right* on the ball!

The Ball . . . a tank float! To be really trouble-free, so important a component requires that the selected material be permanently water-tight and impervious to both corrosion and the attacks of hard or brackish water. As now molded of low-cost Catalin Styrene, this precision-engineered part is markedly superior to its copper prototype. Evidence of the plumbing field's preference for the Amerline* Tank Float is substantiated by the fact that demand remains far and ahead of the millions already produced!

Catalin Styrene is so capable of serving the products of American industry, that we, of the Catalin Service Staff, invite the opportunity to detail its advantages.

CATALIN CORPORATION OF AMERICA • ONE PARK AVENUE, NEW YORK 16, N. Y.

**Tank Floats produced by American Molded Products Co., Chicago, Ill.*

MODERN PLASTICS*

VOLUME 28 JANUARY 1951 NUMBER 5

CONTENTS

GENERAL SECTION

Let's Leave the Chisel Buried (Editorial) 5

Materials in 1950 and the Future 55
MODERN PLASTICS' annual survey of the materials situation takes on added significance in the light of the uncertainties of supply and facilities

Vinyl-Coated Fabric Plane Shelter 57
Portable hanger, large enough to house the largest fighter planes in use, is designed to withstand severe weather conditions

Reinforced-Plastic Life Boat 58
Low pressure molded boat is an absolute replica of standard wooden boats, weighs only half as much, and presents no upkeep problems

Why Benzol? 61
Basic commodity in the chemical industry, the supply of benzol is of utmost importance to the plastics industry

Expendable Plastic Weatherman 62
Lightweight weather-proof housing for radiosonde is being molded of ethyl cellulose

Polyethylene-Nylon on Assault Wire 63
Twisted pair uses 14 lb. of polyethylene and 9 lb. of nylon per mile; reports are that millions of miles will be produced

Application Trends in 1950 65
The probable shape of the future is indicated by a review of typical applications of the past year

Iridescence Built Into Plastics 71
A whole new family of decorative materials has been created by the development of a process for incorporating iridescent particles into rigid sheets, flexible fabrics, etc.

Test Report on Revolutionary Tape 74
by William J. Miller
Pressure-sensitive, adhesive-backed polyethylene tapes, cut from oriented film, offer new values to a number of industries

S.P.E. Technical Conference 77
Program of meeting to be held in New York City, Jan. 18 to 20, 1951

Potted Amplifier in Hearing Aid 78
Polyester resin is used to seal acrylic parts and produce a completely water-proof unit

Display Sticker 128

Document Holder 130

Coaxial Spacers 131

Turnover Switch 132

Battery Wrap 134

Aluminum Pulleys Replaced 137

Injection Molded Santa Claus 139

PLASTICS ENGINEERING

Engineering Developments in 1950 81
How the engineering segment of the industry has consolidated its gains and has made use of new equipment, materials, and processes

Machines for Plastics in 1950 94
Statistics on injection and extrusion machinery sold during 1950

TECHNICAL SECTION

The Year 1950 in Review 97

DEPARTMENTS

Plastics Digest 110

U. S. Plastics Patents 116

Books and Booklets 120

New Machinery and Equipment 124

THE PLASTISCOPE 168
News of the Industry; Predictions and Interpretations; Company News; Personal; Meetings

Modern Plastics, published monthly by Modern Plastics, Inc. at Emmett St., Bristol, Conn. Executive and Editorial Office: 122 E. 42nd St., New York 17, N. Y. Published each month by Modern Plastics, Inc. Entered as second class matter at the Post Office at Orange, Conn., under the act of March 3, 1879. Application pending transfer to Bristol, Conn., Post Office as second class matter.

Copyright 1950 by Modern Plastics, Inc. All rights reserved.

Subscription $5.00 a year, $8.00 for two years in the U.S., its possessions, and South America. Canadian subscription $5.00 a year, $8.00 for two years. All other countries $5.00 a year, $8.00 for two years, payable in U.S. currency. Price of this issue 75 cents per copy. Printed in the U.S.A. by the Hildreth Press, Inc., Bristol, Connecticut.

*Reg. U.S. Pat. Office.

Another new development using

B. F. Goodrich Chemical Company *raw materials*

Sockets sealed tight

TO KEEP LIGHTS BRIGHT!

B. F. Goodrich Chemical Company does not make this socket assembly. We supply raw materials for the coating only.

PARKING lamps and tail lights are living a longer, brighter life now—thanks to a new Geon plastisol-coated socket. This new development not only seals out dust and moisture from the socket assembly, but does away with such frequently unsatisfactory devices as boots, gaskets, grommets, etc.

This new socket, used in certain 1951 cars, is made possible because of the remarkable versatility of the plastisol coating made from Geon paste resin.

A single dip operation using Geon plastisol eliminates as many as three or four of the steps in the production of conventional socket assemblies. Many more automotive, electrical and mechanical parts can be similarly treated.

Note, too, these processing advantages with Geon paste resin. No solvents or expensive mixing equipment are needed. It is easily dispersed in plasticizers to make paste-like fluid. You can use it for dipping or coating, for molding or casting. Many attractive colors may be obtained.

Geon paste resin's adaptability may suggest a product or product improvement to you—a new way to make sales—a new way to solve materials problems. We make no finished products—supply raw materials only. But technical advice is ready at your call. Write Dept. GA-1, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco.

GEON RESINS • GOOD-RITE PLASTICIZERS . . . the ideal team to make products easier, better and more saleable.

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

BIG? Yes...but that's only part of the story

CHICAGO MOLDED PLASTICS

Anyone with a press large enough might mold a big plastic part. But...how many...how fast...and how consistently perfect?

Here at Chicago Molded the volume production of extra large plastics parts is a substantial part of our business...and has been for years. We have a knowledge of methods, materials and techniques that comes only through experience. We have every needed type of equipment including giant presses of the most modern design for compression, injection and plunger molding. So...size *and* quantity present no problem.

For instance, the large Motorola TV cabinet measures 17¾" x 19½" x 18⁵⁄₁₆" and weighs 22 lbs. net. Yet we're turning out hundreds of them every day. Many of the large parts shown below were first produced years ago and some are still in production. No... quantity is no problem. You say how many and we'll deliver as fast as needed to meet your schedules.

As for quality...we have but one standard...the best in molded plastics. It's a standard that has caused the biggest names in industry to select Chicago Molded as a primary source of supply year after year. So...why not discuss your next job with a Chicago Molded engineer? There's no obligation...and you'll find it time well spent. Just write or phone.

CHICAGO MOLDED PRODUCTS CORPORATION
1046 N. Kolmar Ave., Chicago 51, Illinois

COMPRESSION, INJECTION AND PLUNGER MOLDING OF ALL PLASTIC MATERIALS

Let's Leave the Chisel Buried!

Back in late 1946 and early 1947 this industry learned some important lessons the hard way.

It learned that the almighty consumer is always boss, that said consumer has a limited patience with poor quality goods, misapplications, bad design, and sloppy merchandising. It learned that the wrath of the badly stung consumer is visited not only upon the few manufacturers guilty of making poor products, but upon the whole industry—upon all plastics.

In 1947 hundreds of poorly made plastics products were discontinued and replaced on the market by well-designed, well-made items made of the right materials. Miles of improperly plasticized vinyls were scrapped and new films and sheeting were made to stand up to their intended uses. The industry's informative labeling program got under way. Packaging and promotion of plastics products were improved.

Result: three years of phenomenal success for plastics, thousands of worthy products welcomed by the consumer, improved public relations for the industry—and all this in a buyer's market.

The industry learned that it pays to bury the chisel!

Now, as we enter a period of material shortages, of high consumer income, of heavy demands from retailers, the temptation is strong to disinter the old chisel and use it again on the now friendly public.

It's a simple and temporarily profitable matter to cut a molded section from 0.040 to 0.030, to use the tight market in plasticizers as an excuse to make cheaper film, to get careless about compounding, especially of rework material, to undercure a little, to speed up the cycle in adhesive assembly, to get slightly blind on the inspection line. Very simple.

Very simple—and very shortsighted.

It's a simple matter to cancel plans for informative labeling, to put the chisel to promotion, to drop all high endeavors in consumer education. In the coming seller's market, these long-term projects may contribute little to immediate sales. Selling will be simple.

Very simple—for a while.

The scope and duration of material shortages, defense programs—even world wars—have some final limit. When they end or taper off, the consumer—the long-memoried, money-careful, quality-conscious consumer—becomes boss again. The consumer will remember if the chisel appears again now.

There are good assurances that the plastics industry will leave the chisel buried. First, it is literally impossible for unethical fringe enterprisers (born chisellers) to get into the business today in order to make junk for a fast profit. Second, the individual molder or processor or fabricator is bigger today than he was in 1947 and has more to lose if plastics lose consumer confidence. Third, the great work done to build public appreciation of plastics has strengthened the industry's appreciation of its responsibilities, increased its pride in its own products.

But, for many months to come, there'll be opportunities for a quick profit by means of the chisel. There will be great temptation—even great pressure.

Let's leave that chisel buried!

President and Publisher
CHARLES A. BRESKIN

Editorial Staff

Editor: HIRAM MCCANN
Technical Editor: DR. GORDON M. KLINE
Engineering Editor: FRED B. STANLEY
Senior Editor: R. L. VAN BOSKIRK
Managing Editor: A. PAUL PECK
Art Director: DONALD R. RUTHER
Associate Editor: WARREN H. GOODMAN
Assistant Managing Editor: E. S. BLACK
Assistant Editor: JOAN MOISSEIFF
Midwestern Editor: VAL WRIGHT
European Editor: HOWARD WILLIAMS
Readers Service: EMMA TURAK

Business Staff

Vice President and General Manager:
ALAN S. COLE

P. H. Backstrom — B. W. Gussow
M. A. Olsen — W. F. Kennedy
J. M. Connors — J. C. Galloway
R. C. Beggs — S. S. Siegel

Promotion Manager: PHILIP W. MULLER
Production Manager: DANIEL M. BROADS
Asst. Production Manager: B. J. FARINA

Circulation Department

Circulation Manager: FREDERICK A. KLEIN
32 Broadway, New York 4, N. Y.
Tel., WHitehall 4-4782

Executive and Editorial Offices

122 E. 42nd St., New York 17, N. Y.
Tel., MUrray Hill 3-0655

Branch Offices

Chicago 1: 221 N. La Salle St.
J. M. Connors — Tel., Financial 6-3450

Cleveland 14: 815 Superior Ave.
R. C. Beggs — Tel., SUperior 1-0737

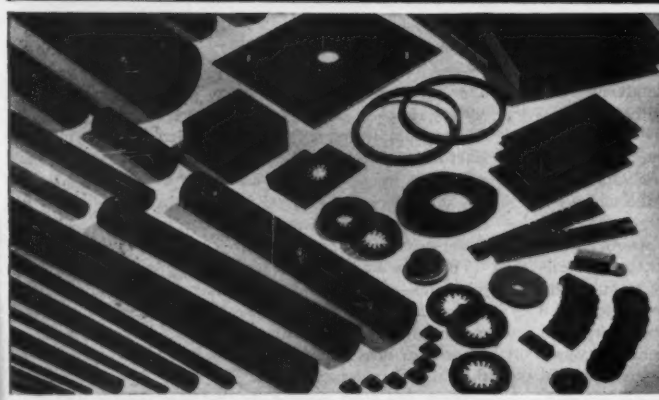
Los Angeles 17: 816 West Fifth St.
J. C. Galloway — Tel., Mutual 8335

London, England:
L. H. Dolaro

MODERN PLASTICS is fully protected by copyright and nothing that appears in it may be printed wholly or in part without special permission.

Member Audit Bureau of Circulations
MODERN PLASTICS is regularly indexed in Industrial Arts Index and Industex.

INSUROK PLASTICS



LAMINATED

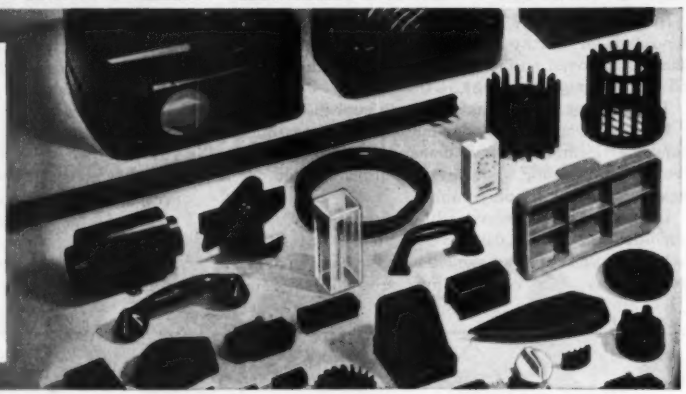
INSUROK

Available in sheets, rods, tubes, and fabricated parts, in many grades, sizes, and thicknesses. Meets practically any requirement for uniformity, machinability, dielectric and physical strength.

MOLDED

INSUROK

Parts made to your specifications with various granular or chopped fabric base materials. Produced by compression, injection, or transfer process. Metal inserts can be molded into position.



RICHARDSON OFFERS YOU A Complete Range of TECHNICAL SERVICES

Richardson offers the extensive services of its research, design, and engineering staffs without cost or obligation. We provide custom molding, laminating, and fabrication facilities and techniques. This assures the correct selection of material and process for every application.

RESEARCH

For over one-quarter century, Richardson has pioneered in the development of new plastics and the improvement of old.

DESIGN

Experienced engineers analyze your requirements and help you select material, form, and process best suited to your needs.

PRODUCTION

Richardson has the plant equipment and know-how to handle even the largest, most difficult molded or laminated job.

FABRICATION

Complete facilities for punching or machining parts to your design and in any quantity.

SALES OFFICES

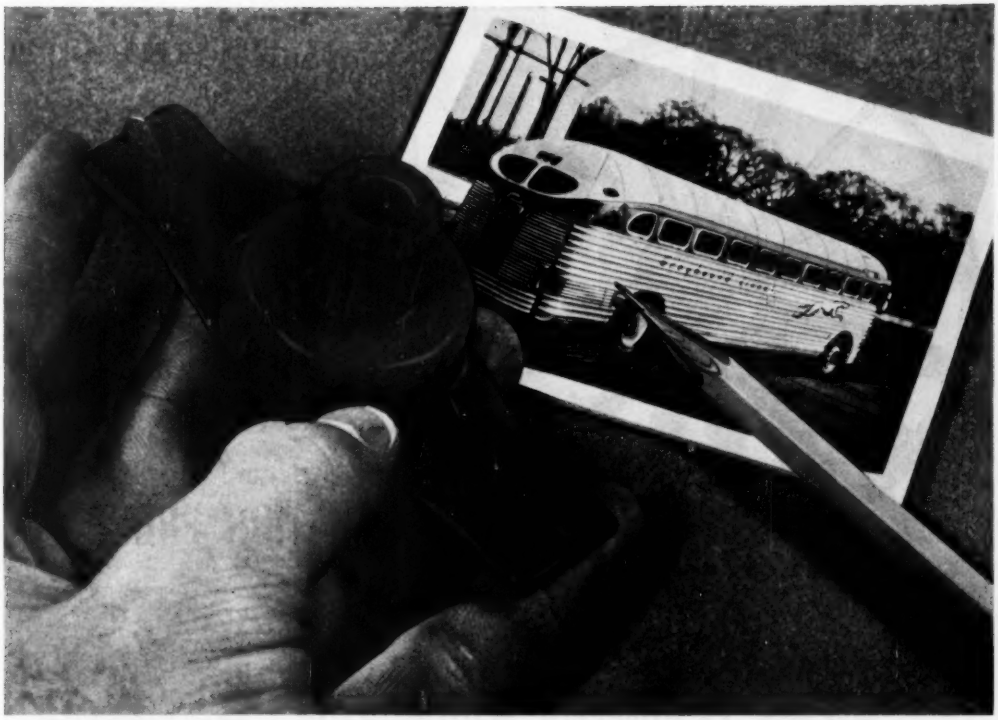
MELROSE PARK, (2789 Lake St.) ILL., (Chicago Phone: Mansfield 6-8900)
CLEVELAND 15, OHIO (315 Plymouth Bldg., 2036 East 22nd St.)
DETROIT 2, MICH. (6-252 General Motors Bldg.)
LOCKLAND, CINCINNATI 15, OHIO (89 South Cooper Avenue)
MILWAUKEE 3, WIS. (State Bank Bldg., 743 N. 4th St.)
NEW YORK 6, NEW YORK (75 West Street)
PHILADELPHIA 40, PA. (3728 North Broad St.)
ROCHESTER 4, NEW YORK (1031 Sibley Tower Bldg., 25 North St.)
ST. LOUIS 12, MO. (5579 Pershing Avenue)

INSUROK Products Also Distributed By The Following:

KANSAS CITY 5, MO. (25 E. 65th St.) B. H. Williams
LOS ANGELES 13, CALIF. (837 Traction Avenue) R. S. Hannah
SAN FRANCISCO 3, CALIF. (357 Tehama St.) Fred L. Mitchell
SEATTLE 4, WASHINGTON (500 Pelson Bldg.) Fred G. Greaves
MONTREAL 25, QUEBEC, CANADA (1440 St. Catherine St., West) G. A. Kittredge

The RICHARDSON COMPANY
Founded 1858

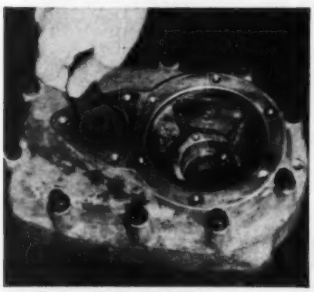
2789 Lake Street, Melrose Park, Illinois (Chicago District)



DU PONT NYLON CUTS COST OF COUPLING ABOUT 90% ...SOLVES VITAL WEAR PROBLEM

Replacements in Greyhound diesels reduced phenomenally

The Greyhound Corporation has not only solved a serious mechanical problem with this nylon plastic part, but has also cut costs of the part itself by about 90%. The source of trouble was a two-piece steel coupling in diesel bus engines (connecting the water pump with a drive shaft from the blower). This part failed so frequently that as many as 200 buses went to the repair shop each month to have a new coupling installed.



ELASTICITY OF NYLON permits easy installation of the part. The nylon oil flippers that protrude from the coupling are flexible, permitting the part to be installed or removed without extensive dismantling of the engine. Cuts maintenance time and costs... another saving for Greyhound!

After many modifications of the steel part failed to stand up, nylon plastic was tried. Now, out of 1000 nylon couplings in use for six months, only a few have had to be replaced.

The new and intricate nylon part is made in one piece by rapid, mass-production injection molding. This, plus the fact that nylon's light weight makes it much cheaper than many metals on a volume basis, accounts for Greyhound's remarkable cost saving.

Nylon is strong, tough and resilient ... absorbs shock and vibration ... resists wear ... operates quietly and smoothly with less lubrication than is required for metals and, in some cases, with no lubrication at all.

Perhaps you have a problem this versatile plastic might solve. Demand for nylon currently exceeds our ability to supply. However, we suggest you investigate and evaluate the properties of nylon for future application and product improvement. Experimental quantities are available. For additional information on nylon and other Du Pont plastics, write:

E. I. du Pont de Nemours & Co. (Inc.)
Polychemicals Dept., Sales Offices:
350 Fifth Avenue, New York 1, N. Y.
7 S. Dearborn St., Chicago 3, Ill.
845 E. 60 St., Los Angeles 1, Calif.

Nylon coupling molded by Sinko Mfg. & Tool Co., Chicago, Illinois.

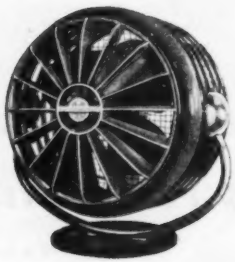
DU PONT
PLASTICS
Better Things for Better Living
...through Chemistry

Westinghouse

designed
plastic
air jet vanes
help
solve

AIR CIRCULATION PROBLEMS

BRIDGEPORT MOULDED AIR JET VANES
GIVE NEW Westinghouse *Whirlaire*® FANS
AMAZING AIR PENETRATION



The new Whirlaire fans solve the toughest air circulation problems. With mesh-woven grilles, the Whirlaire throws a flood of air right in front of fan. When grille is replaced by plastic Air Jet Vane, the air stream penetrates in a straight line to amazing new distances. Never before has a fan given such complete circulation!

The new Air Jet Vane is injection moulded of Dow #475 Styrene to meet the famous strict specifications of Westinghouse. Moulded in two sizes 17″ and 22″ in diameter. Just another example of the scope and ability of Bridgeport plastic moulding services. Perhaps we can help you, too. Write today to . . .

BRIDGEPORT MOULDED PRODUCTS, INCORPORATED

BOX 3276-O BARNUM STATION BPM BRIDGEPORT 5, CONNECTICUT

Are you up-to-date on ACETATE?

Do you know that *acetate* is one of the most perfected of plastics . . . that more and more product designers and manufacturers are depending on acetate when they want to give products the durability and good looks that guarantee consumer acceptance.

Here are some of the qualities that 1951 Celanese* *acetate* has to offer:

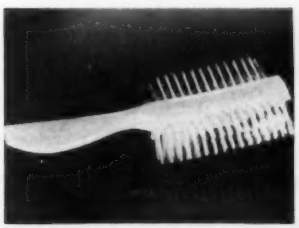
- **Economy of price**
- **Economy of production**
- **Economy of high speed moldability**
- **Economy of machinability**
- **Special heat and flame resistant formulations that meet UL product requirements**
- **Special pearl colors that give a luxury look to competitively-priced merchandise.**

Celanese, the pioneer in *acetate* development, is ready to show you what 1951 *acetate* can do for your products . . . how 1951 *acetate* can supply shatterproof-splinterproof toughness, permanent surface lustre, full color range and good dimensional stability.

TOILET SEATS. Nearly every manufacturer is a user of Celanese Acetate.

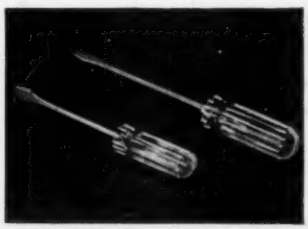
SUN GLASSES. Leading manufacturers specify Celanese Acetate.

TOYS. For durable toys nothing compares with Celanese Acetate.



HAIR BRUSHES. Celanese Acetate is the specified plastic for many of America's popular brands of brushes.

APPLIANCE HOUSINGS. Celanese Acetate used on many UL approved electrical products.



TOOL HANDLES. For impact strength and economy nothing is better than Celanese Acetate.

Call a Celanese representative for specific information about *acetate* for your products.

Celanese Corporation of America, Plastics Division, Dept. 101-A, 180 Madison Avenue, New York 16. In Canada, Canadian Cellulose Products Ltd., Montreal and Toronto.

Celanese*

*Reg. U. S. Pat. Off. PLASTICS

CUSTOM COMPOUNDING

[Accent on "Custom"]

Proof by Laboratory Test **FREE***

There is no other custom compounding service of thermoplastic materials available like Westchester's.

The self-same material you send us is the very same material you get back – custom-compounded – and as faultlessly color-matched as is humanly (and scientifically) possible. Note: We maintain no scrap stock piles. We do not buy or sell scrap. Your material is kept separate and apart and ear-marked as your stock only.

*Try **FREE** One-Pound Sample Test

* Send Westchester one-pound samples of the vari-colored materials representative of colors you normally run, stating preference on shades to be custom-compounded. Westchester will match samples and return "swatches" for approval.

Your scrap is your answer to shortages.

This genuine custom-compounding of scrap is more than sound, business-like economy; it is a real service to manufacturers with a carefully sorted scrap recovery system in these days when materials are so tight.

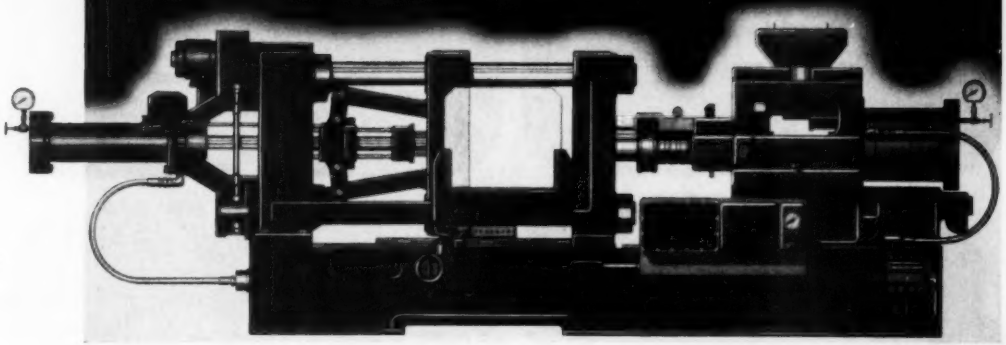
And with your scrap, Westchester can re-color, pearlize, metallize, or tinsellize, and blend into uniform flowing material the scrap or re-grinds from different runs of the same material.

Prove Westchester's custom-compounding with the accent on "*custom.*" Phone, wire or write to get free sample from your own material with Westchester's one-pound test.

WESTCHESTER PLASTICS

WESTCHESTER
PLASTICS INC.
MAMARONECK, NEW YORK
Phone: Mamaroneck 9-0080
Custom Compounders of Thermoplastic Materials

NEW DESIGN MAKES REED-PRENTICE 10 H-24 and 32 OZ. MACHINES EVEN MORE EFFICIENT

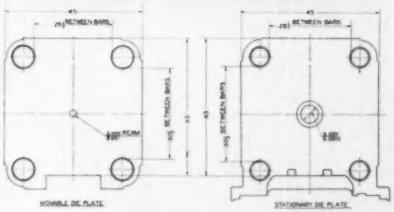


Extensive design changes greatly improve the construction and operating features of the popular Reed-Prentice 10H-24 and 32 oz. Plastic Injection Molding machines.

The improved 24 oz. and 32 oz. models have 45-inch square die plates compared to the 30-inch square plates of previous models and a fully adequate 24-inch stroke. Larger dies are readily accommodated and the casting area is substantially increased.

Tie bar construction — proved to be the most efficient and practical type — affords maximum support, and the heavy one-piece fabricated steel base insures machine rigidity under all conditions.

For complete details on these improved machines, write Dept. "D" today.



SPECIFICATIONS

	24 oz.	32 oz.
Die locking pressure, tons	600	600
Rated casting area, sq. in.	300	300
Mold Opens	24"	24"
Maximum die space	28"	28"
Size of die plates (H x V)	45" x 45"	45" x 45"
Weight approx.	35,000 lbs.	36,500 lbs.

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

REPRESENTATIVES:

Detroit ..... Kordenbrock Machinery Co.
Grand Rapids ..... Joseph Monahan Co.
Syracuse ..... J. F. Owens Machinery Co.
Houston ..... Preston Machine Tool Sales Co.
Seattle & Spokane ..... Star Machinery Co.
Minneapolis ..... Chas. W. Stone Co.
Portland, Ore. ..... Star Machinery Co.

INJECTION MACHINES
REED-PRENTICE CORP.
WORCESTER MASS., U.S.A.

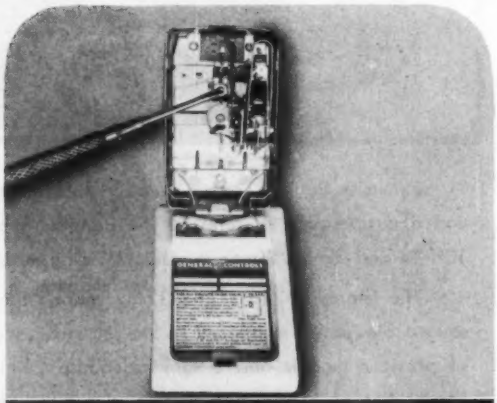
MAIN OFFICE:
Worcester 4, Massachusetts

BRANCH OFFICES:
New York 6, N. Y.
Cleveland 13, Ohio
Chicago 12, Illinois
Los Angeles 58, Calif.

informative labeling in action...

Informative Kum-Kleen Labels carry important technical instructions directly on the product where they belong.

Synchronized to the production line, Kum-Kleen Dispenser Labels pay for themselves in labor savings.



Kum-Kleen Informative Labels can't be lost or misplaced — are a permanent record on the product—for the life of the unit.

Kum-Kleen Informative Labeling does far more than help to sell. For example General Controls use Kum-Kleen pressure-sensitive labels to eliminate unnecessary service and installation costs by supplying technical information directly on the product *where it belongs.* Kum-Kleen Labels, applied at production line speed — stick-and-stay-stuck, never pop or curl off. They provide a safe, positive, low cost method of transmitting your important message to the men who need it most. Whether your problem is informative labeling for greater consumer sales or simplifying technical installation and service — you'll find conveyor belt rolls of Kum-Kleen Labels, plus the speed of Kum-Kleen labeling, the answer to your informative labeling problems.

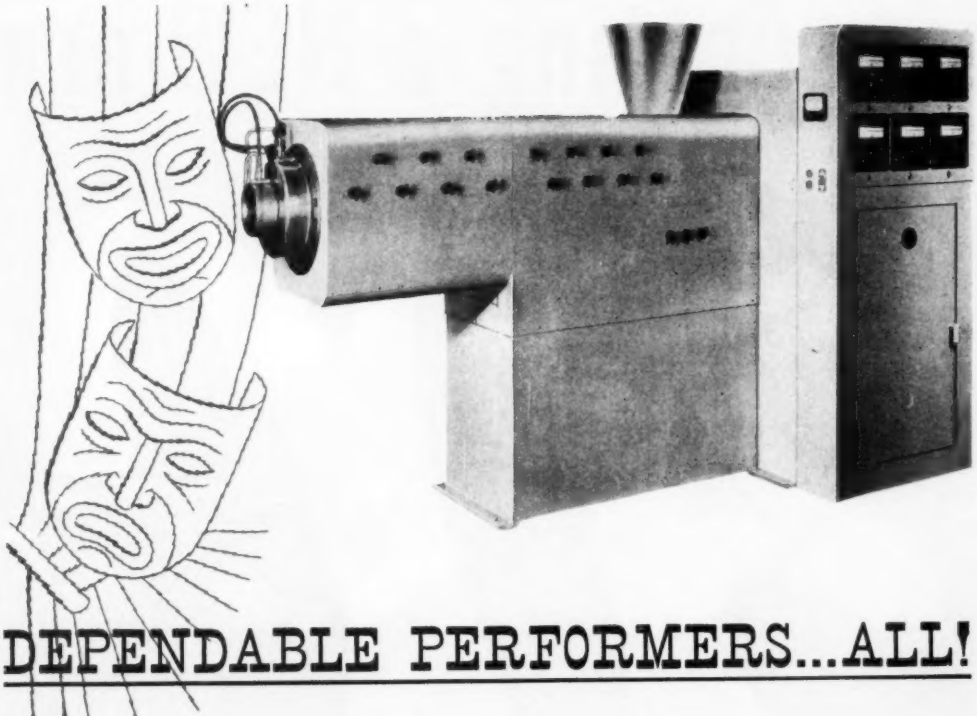
Write for samples and prices

Kum-Kleen®

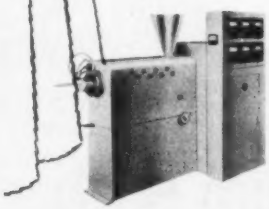
AVERY ADHESIVE LABEL CORPORATION

NEW YORK CITY: 41 Park Row
DETROIT: 3049 East Grand Boulevard
CLEVELAND: 2123 East 9th Street
PHILADELPHIA: 1069 Commercial Trust Building
CHICAGO: 608 South Dearborn Street
CINCINNATI: 626 Broadway Street
MONROVIA, California

Representatives In All Principal Cities



DEPENDABLE PERFORMERS...ALL!



MPM extruders, in all sizes, are in daily use in more than eighteen countries outside of the United States.

Materials extruded include nylon, Kel-F, polystyrene, acetate, methacrylate, polyethylene, polyvinyl chloride and Formvar.

When the "show must go on" MPM extruders can be depended upon to maintain close tolerances, high output and uninterrupted production, week after week, month after month, year after year.

The experience of countless extruders all over the world tells the story: MPM extruders are known to have the built-in endurance that insures production that is both continuous and profitable.

MPM extruders, in all sizes, have screws, strainers, cylinders, die heads, hoppers, and other vital parts which are made of corrosion resistant materials through and through.

And MPM extruders won't be outdated by the introduction of new plastic materials. Some models have as many as fifteen separate cooling zones . . . all have internally heated or cooled screws. Proof of their versatility can be found in the fact that nearly all major material manufacturers now use MPM extruders for laboratory development work.

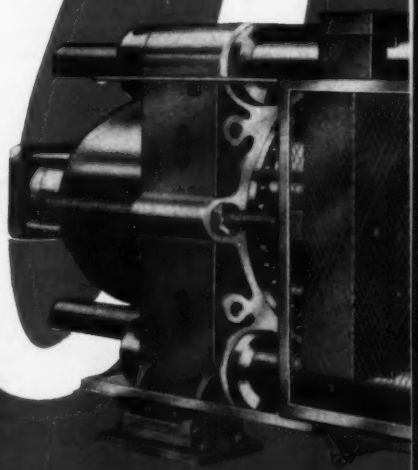
Indications are that the demand for extruded products will grow for many years to come. Owners of MPM extruders and auxiliary equipment will be in the best position to meet this demand. Ask today for full data about an MPM extruder that will be your most dependable performer.

15 Union St., Lodi, N. J., U. S. A.
Cable Address: MODPLASEX

Inaugurating a NEW era

the new

300



Watson-Stillman Injection Molding Machine

DIE SPACE 48" X 72" — CLAMP 1500 TONS

NEW ECONOMY... NEW FLEXIBILITY

Significant evidence of Watson-Stillman's ability to anticipate and meet, unusual requirements of plastics machines is the record-smashing 300-ounce Injection Machine . . . NOW READY FOR YOU.

Fifty per cent larger than its largest predecessor, this—latest—compact unit opens new vistas to every department of plastic products development. For the designer: larger integral moldings, heavier sections where needed, without prying capacity. For the production chief: less operating expense and lower maintenance per pound, or unit, of production. For top management: greater PROFITS, through broadened scope of facilities, improved competitive position, and all the other advantages naturally associated with increased unit capacity and greater over-all production.

This machine, like others in the W-S COMPLETELINE, was developed to meet existing needs of the industry. Whether you mold one ounce or fifteen pounds, and, whether you need INJECTION, TRANSFER or COMPRESSION Molding Machines, you will find the most efficient, economical, and profitable answer to your equipment needs through the close integration of Watson-Stillman's development and manufacturing facilities which always match the methods and markets of our fast-moving industry.

Remember—when planning plant expansion or a new business—consult W-S first about plastics machinery *and how to use it.*

For 1 to 300 OUNCE MOLDINGS— the W-S COMPLETELINE

in plastics moulding...

OZ.

HYDRAULIC MACHINERY DIVISION

WATSON-STILLMAN

Established 1848—Factory and Main Office, 150 Aldene Rd., Roselle, New Jersey
Branch Office: Chicago, Ill. Manufactured in Canada by—Canadian Vickers, Ltd., Montreal

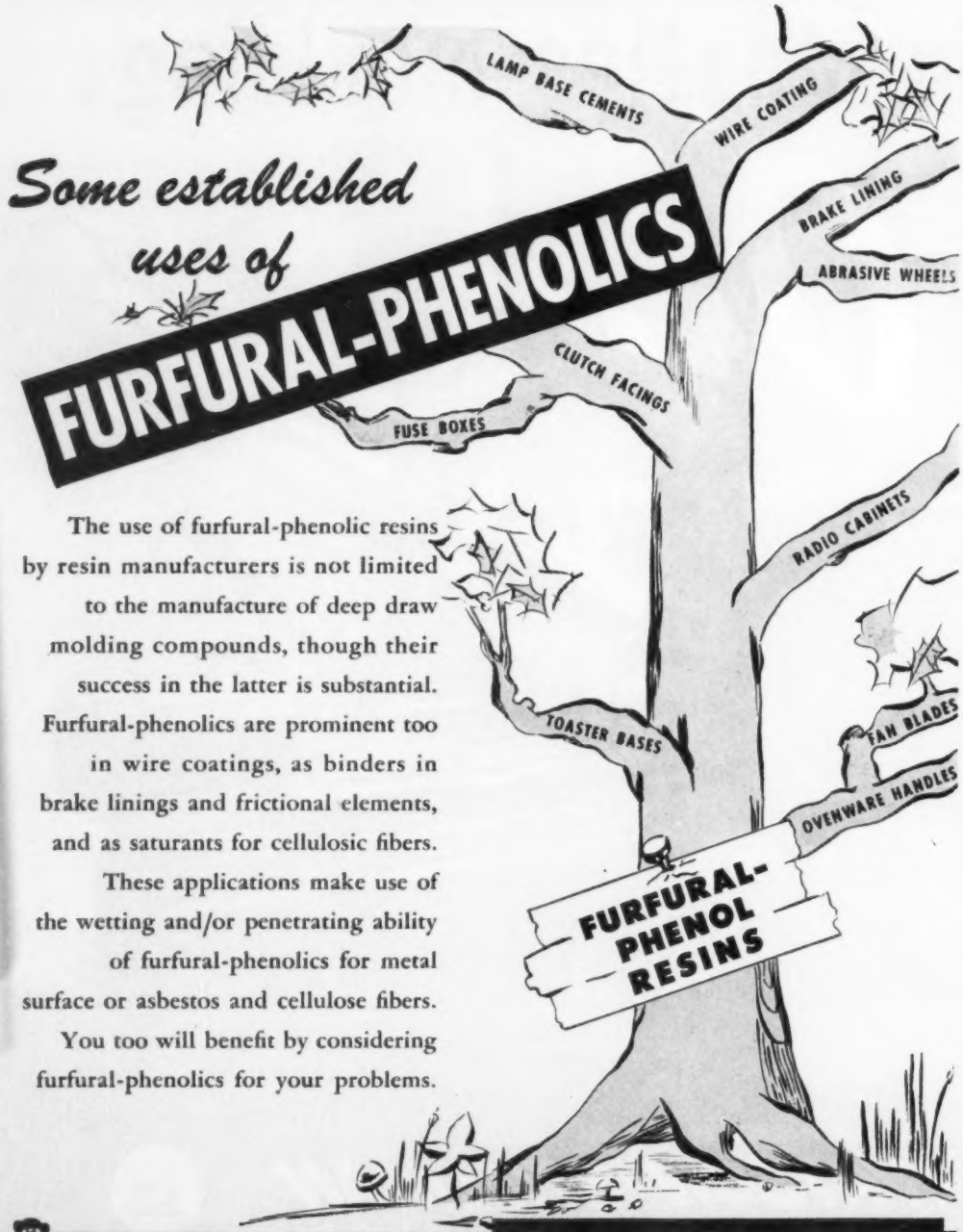
Representatives

Birmingham 3, Ala. — George M. Meriwether
Denver 2, Colo. — Overgard Machine Tool Co.
Indianapolis 20, Ind. — W. K. Millholland Mach. Co.
Los Angeles 11, Calif. — H. M. Royal, Inc.
Pittsburgh 19, Pa. — Stanley Berg & Co.
Portland, Ore. — Machinery & Tool Supply Co.
Rochester 12, N. Y. — Watson-Stillman Co.
San Francisco 7, Cal. — Schellenbach Mach. Tool Co.
St. Paul 4, Minn. — Anderson Machine Tool Co.
Seattle, Wash. — Machinery & Tool Supply Co.
Spokane 8, Wash. — Machinery & Tool Supply Co.

Foreign Sales Representatives: OMNI PRODUCTS CORP., 460 Fourth Ave., New York 16, N. Y.
Correspondents Throughout the World

Y-R-33

. . . the shortest distance between production and profit



Some established uses of FURFURAL-PHENOLICS

The use of furfural-phenolic resins by resin manufacturers is not limited to the manufacture of deep draw molding compounds, though their success in the latter is substantial. Furfural-phenolics are prominent too in wire coatings, as binders in brake linings and frictional elements, and as saturants for cellulosic fibers.

These applications make use of the wetting and/or penetrating ability of furfural-phenolics for metal surface or asbestos and cellulose fibers. You too will benefit by considering furfural-phenolics for your problems.

The Quaker Oats Company — **CHEMICALS DEPT.**

337G THE MERCHANDISE MART
CHICAGO 54, ILLINOIS
EASTERN SALES OFFICE:
1240G WHITEHALL BUILDING, NEW YORK 4, N. Y.

In San Francisco, The Griffin Chemical Company • In the United Kingdom, Imperial Chemical Industries Ltd., Billingham, England • In Australia, Swift & Company, Pty. Ltd., Sydney • In Europe, Quaker Oats-Graanproducten N. V., Rotterdam, The Netherlands; Quaker Oats (France) S.A. 42, Rue Pasquier, Paris 8E, France • In Japan, F. Kanematsu & Company, Ltd., Tokyo

How PLASTICS Help Make It Hot for Colds

Don't worry about cold bugs! Just get this wonderful Prak-T-Kal Electric Automatic Vaporizer. *And don't worry about production bugs*—even if you need plastic parts to be subjected indefinitely, like these, to boiling water and steam at 170° F. Just ask for Kurz-Kasch production.

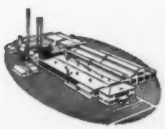
The heart of this "Safest-Rated" vaporizer consists of electrodes located in the plastic cores (A or B, depending on unit size). Water valved into cores is brought to a boil there and generated into steam expelled through moulded-in recess for medication cup in cap. To secure extra-dense castings, the cores are compression-plunger moulded, and the caps are plunger moulded. Result: stable dimensions under all operating conditions without swelling or cracking—no porosity—no shorts—performance rated by a prominent consumer-evaluation service as one of the safest in the field.

Here's a germ (of an idea) we would like to expose you to. Leading manufacturers in *all* lines come to Kurz-Kasch for expert engineering help—for experienced tool-making—for conscientious, dependable plastics production. If you need a thermo-setting supplier, our 34 years of custom-moulding experience should make a strong case for us. Just call.

(Above) Prak-T-Kal Automatic Vaporizer, by Practical Electric Products, Inc. Approved and Listed by Underwriter Laboratories, Inc. Plastic components moulded by Kurz-Kasch.

Kurz-Kasch

FOR OVER 34 YEARS PLANNERS AND MOULDERS IN PLASTICS



Kurz-Kasch, Incorporated • 1415 South Broadway • Dayton 1, Ohio

BRANCH SALES OFFICES: New York, *Lexington 2-6677* • Rochester, *Hillside 2415M* • Chicago, *Harrison 7-5473* • Detroit, *Trinity 3-7050* • Philadelphia, *Granite 2-7484* • Dallas, *Lakeside 1022* • Los Angeles, *Prospect 7503* • St. Louis, *Delmar 9577* • Toronto, *Girard 9711* • **EXPORT OFFICE:** 89 Broad Street, New York City, *Bowling Green 9-7751.*

The fault was in choosing the wrong type fastener . . . but

THE MOLDER WAS BLAMED

When "tough breaks" like this occur —and they happen too often in assembly with plastics parts—it's the custom molder, usually, who gets the blame. Yet, all too often, the fault lies *not* with the molding compound but with the fasteners used by the manufacturer.

Use of the wrong *type* of fastener may not only damage the molder's reputation unfairly . . . it can *wipe out* your profits, through parts spoilage and increased production costs. That's why so many good custom molders, interested in their customers' problems, get recommendations first from Parker-Kalon.

First, because Parker-Kalon makes a complete line of Self-tapping Screws —will fit the fastener to your special needs, *not* your needs to the fastener.

Second, because Parker-Kalon, originators of Self-tapping Screws, learned long ago how to keep hardness and toughness properly balanced in *every* screw—learned to maintain the uniform quality that keeps fast-moving assembly lines trouble-free. And there's no substitute for 35 years experience.

So question the efficiency of your fastening method before you blame your molder. Call in a P-K Assembly Engineer—preferably at the design stage. It will pay you—in fewer rejects, faster assembly, and help your molder serve you better. Parker-Kalon Corporation, 200 Varick St., New York 14, N. Y. Sold everywhere through accredited Distributors.

*TRADE MARKS REG. U.S. PAT. OFF.

P-K TRADE MARK

The Original

PARKER-KALON* SELF-TAPPING SCREWS

A TYPE AND SIZE FOR EVERY METAL AND PLASTIC ASSEMBLY

Colors

to tug at pursestrings

Ferro inorganic colorants move plastic products over retail counters! With them, you obtain—consistently—the subtle and harmonious colors needed to present your products to best advantage.

You get other advantages, too. Ferro pigments are stable, light-fast, electrical and chemical resistant; are unaffected by weather extremes. They are nonbleeding, nonmigrating, have low bulking value, and are easy to work.

Ferro dry colors are specially formulated for use in polystyrene, polyethylene, polyesters, and plastisols. For our latest Color Chart—or for help in solving a specific color problem, write Ferro today.

FERRO ENAMEL CORPORATION • COLOR DIVISION
4150 EAST 56th ST. CLEVELAND 5, OHIO

In Canada, write Ferro Enamels (Canada) Ltd., Oakville, Ontario. Associate Ferro Companies in Argentina, Australia, Brazil, England, France, Mexico, Union of South Africa, and Holland.

WORLD'S *largest* INJECTION MOLDING MACHINE

. . . 300-ounce capacity . . . die space 48" x 72" . . . clamp 1500 tons . . . over 1000 sq. in. projected area . . . depth of draw 18"

Amos MOLDED PLASTICS...

IS *first* AGAIN . . .

From 6 ounce capacity in 1939 to 300 ounce in '51 . . .

Proof- positive that AMOS *continues the pioneering* that brings you larger, finer injection-molded plastics at lower costs.

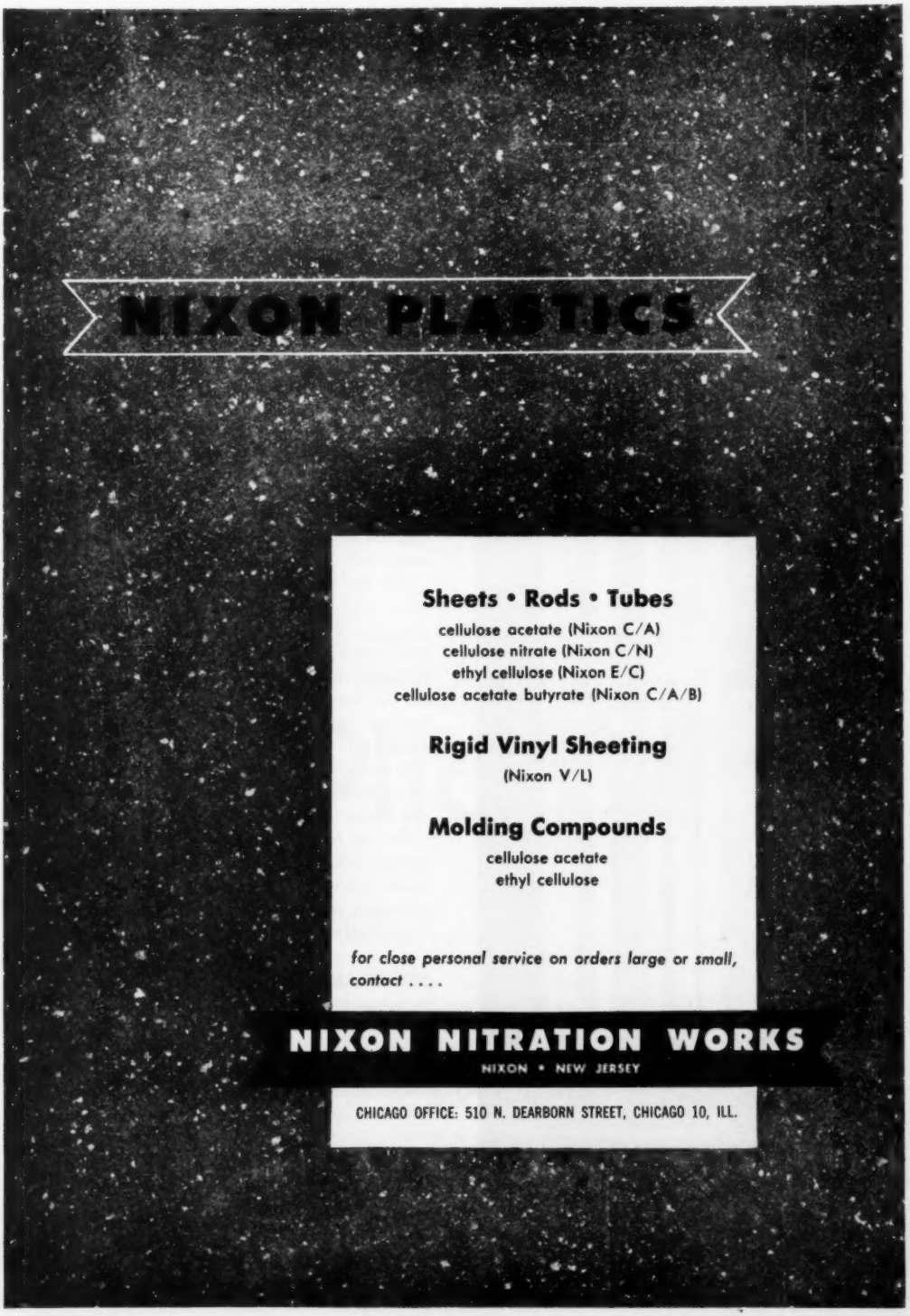
Yesterday's limitations no longer apply today. Large pieces, deep draws, heavy wall sections—which only a few months ago were a dream of the future—*are now entirely practical . . . at* AMOS.

Perhaps YOU have a product problem that can be solved by AMOS' new 300-ounce injection molding machine—*world's largest and first at* AMOS.

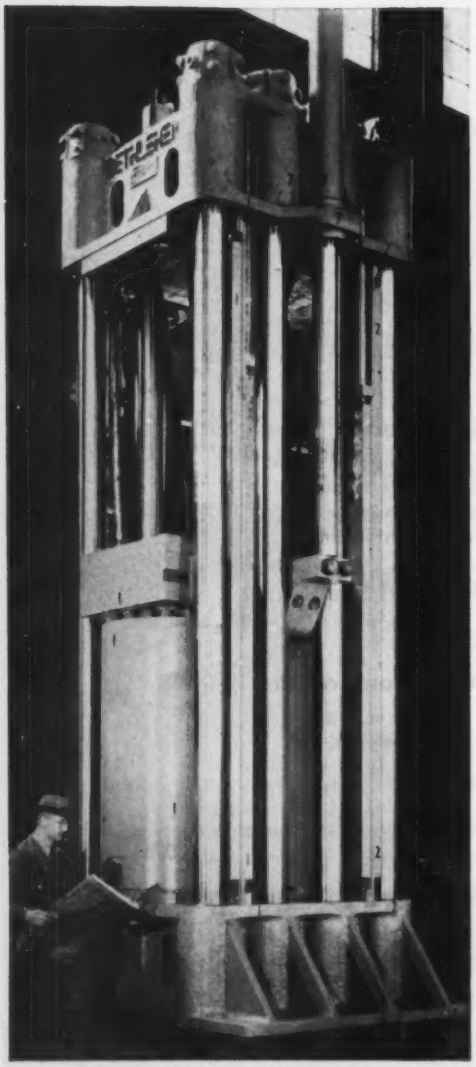
Now more than ever before it will pay you to let AMOS do the complete job right —DESIGN, ENGINEER, TOOL, MOLD and FINISH—all under *one* roof in one of the *most modern* plants in the industry. *Contact* AMOS . . . *Now.*

AMOS MOLDED PLASTICS • Edinburg, Indiana • Offices: New York, Chicago, Detroit, Philadelphia

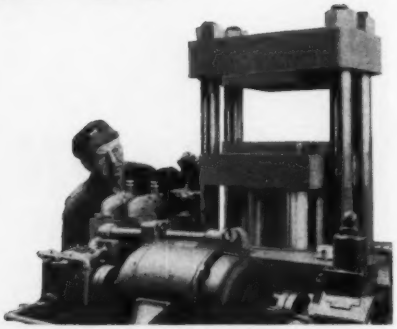
Will *Your* Product Fit Here?


NIXON PLASTICS
Sheets • Rods • Tubes
cellulose acetate (Nixon C/A)
cellulose nitrate (Nixon C/N)
ethyl cellulose (Nixon E/C)
cellulose acetate butyrate (Nixon C/A/B)
Rigid Vinyl Sheeting
(Nixon V/L)
Molding Compounds
cellulose acetate
ethyl cellulose
for close personal service on orders large or small, contact . . . .
NIXON NITRATION WORKS
NIXON • NEW JERSEY
CHICAGO OFFICE: 510 N. DEARBORN STREET, CHICAGO 10, ILL.

To the buyer who wants his presses "JUST SO"



A medium-sized (2670-ton) Bethlehem molding press.



In building hydraulic presses we expect, naturally, that our customers will insist upon accuracy in every small detail.

We like that, for we're very particular too. About those fine points of engineering that make or break a design. About the craftsmanship that's the difference between a good part and a bad one. About the forgings, castings, and other components that make up the finished product. Even about small metallurgical points that the average buyer might not think of.

In short, you'll find Bethlehem a mighty dependable builder — and designer, too, if you care to put the whole job in our hands.

See us for hot-plate, molding, or metal-forming presses with self-contained or separate power equipment — or without the power system, if you choose to furnish your own. We'll do a good job for you . . . from blueprints to finished product.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

BETHLEHEM *Custom-Built* HYDRAULIC PRESSES

FOR PLASTICS . . . METAL-FORMING . . . FIBER BOARD . . . WALLBOARD . . . LINOLEUM . . . VULCANIZING

Check the qualities you want in your product

Durability
Toughness
Strength
Lightness
Abrasion Resistance
Rigidity
Impact Resistance

TEXTILE *Cable Respooler Spool of light alloy steel with tough, durable ends molded of* PLIO-TUF. *Akron Spool & Manufacturing Company and their customers find spool ends molded of* PLIO-TUF *eminently satisfactory after years of hard use.*

You get them all with Plio-Tuf

TEXTILE spools like this must have *all* the characteristics listed above. They take a terrific beating in service—have to resist the tremendous force of the "end-thrust" produced by the rapid reeling of thread—the impact of being thrown into carts after being filled. Ends of these spools are now being molded of **Plio-Tuf**—Goodyear's blend of Pliolite S-6 resin and natural or synthetic rubber. One of the largest users of these spools states they are THE BEST HE HAS SEEN IN MANY YEARS OF MILL EXPERIENCE.

Plio-Tuf brings to a wide range of products the qualities listed here. In addition, it is easily mixed and processed, gives faithful mold reproduction, is easy to machine or buff to a high gloss, and is resistant to water and chemicals. By varying the proportions of resin and rubber, and incorporating various loadings, you can secure a wide range of weights, hardness, rigidity, impact resistance and color with **Plio-Tuf.**

Plio-Tuf can be easily prepared on conventional rubber-mixing machinery, or obtained in an already-mixed master batch. For details and sample, write:

Goodyear Chemical Division
Akron 16, Ohio

USE PROVED *Products*

Plio-Tuf, Pliolite—T.M.'s The Goodyear Tire & Rubber Company

GOODYEAR

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

Plastics for INDUSTRY

Pictured above is the lucite nameplate, manufactured by Cruver for the Westinghouse Unitaire air conditioning unit. Actual size is 10-1/4 inches long by 2-3/4 inches wide; decorated by the Cruver Bas-Releef process in bright silver and black.

CRUVER

MANUFACTURING CO.

2460 W. JACKSON BLVD., CHICAGO 12, ILL.

BRANCH OFFICES

DETROIT MINNEAPOLIS NEW YORK

CLEVELAND ST. LOUIS

NOT A LAMINATE,

THIS is a plastic molding compound!

It is one of the FIBERLOYS by Rogers. Ten years ago, Henry Ford made part of a car body from it. Build a big enough press, and you can make entire car bodies from it. Today it is specified in certain military contracts. Tomorrow, we'd like to create a variation of it to meet your special requirements.

PLASTICS by Rogers are special purpose, impact phenolics. They include the only molding compounds produced in sheets. They provide the most efficient, least expensive method of using high impact molding materials. Some are furnished in bulk form for molding. Some are special purpose laminates.

OTHER FIBERLOYS include the exciting new DUROIDS. These are special formulations developed to supply specific mechanical and chemical characteristics. The DUROIDS blanket the range of materials properties from laminated plastics, down through vulcanized fibre to paperboard.

USING FIBERLOYS results in better parts for better products. Many of them are fabricated to customer specifications by Rogers' Fabricating Division.

Better Parts for Better Products

ROGERS
CORPORATION
Established in 1832

AN ENTERTAINING BOOKLET **— "Here's Rogers and its Fiberloys" will help you decide whether you have a place for the FIBERLOYS. Please write for it, to Dept. P, Rogers Corporation, Manchester, Connecticut.**

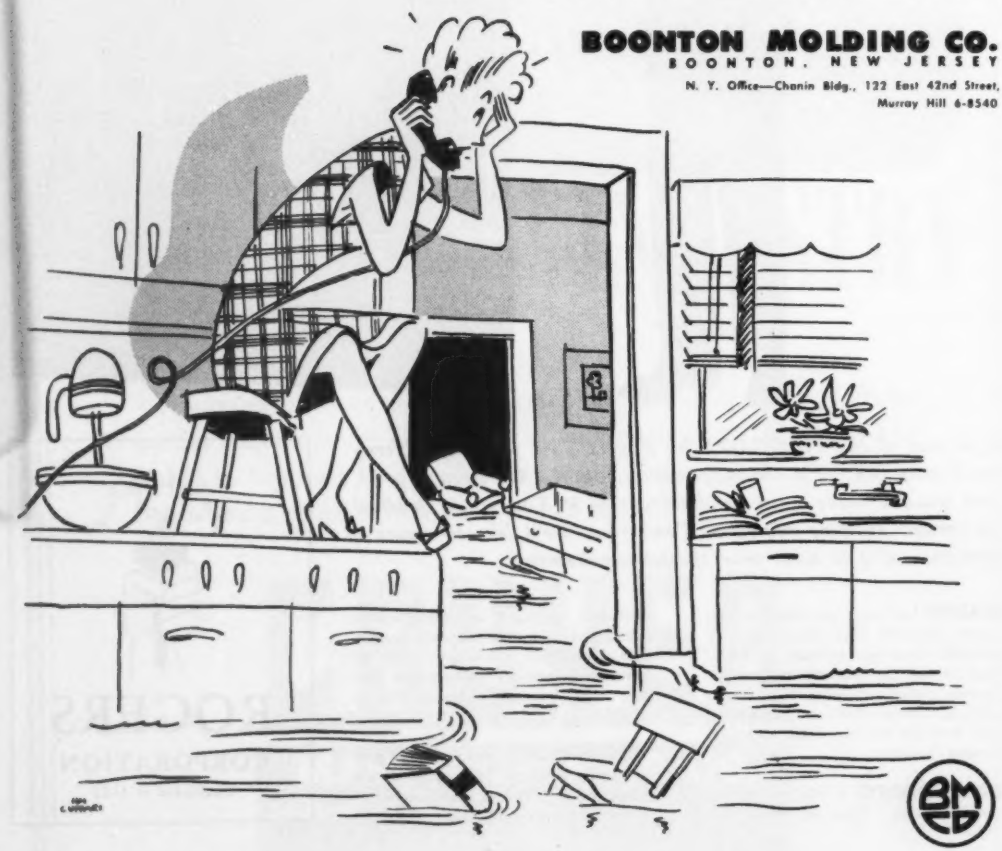
Hello, John Dear?... Can This Boonton That You're Always Raving About—Solve Absolutely Any Situation??

No, Mrs. Smith, when your husband, "John Dear," was discoursing on the fact that we do everything, including the *impossible* jobs here at Boonton, he was referring to plastics molding in all its complicated phases. What you need, Mrs. Smith, is an artisan who repairs water pipes, and from the looks of things—P.D.Q. We do a bit of plumbing, but only that which is necessary to keep our battery of injection and compression presses working at optimum efficiency.

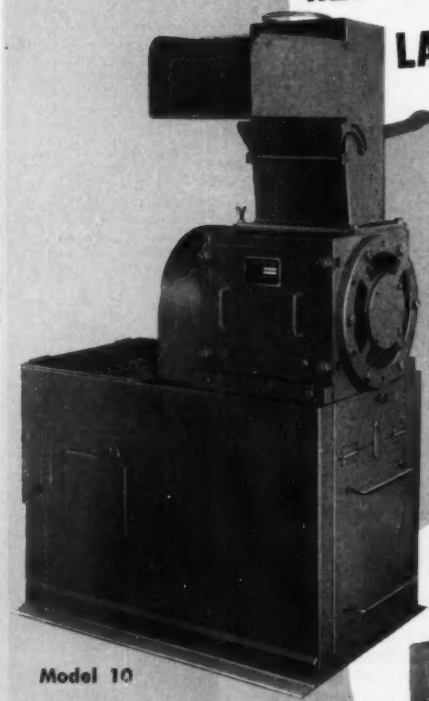
There are a lot of jobs we are not equipped to handle. In spite of the fact that we wrote a book entitled "A Ready Reference For Plastics", which our customers swear by, there are some jobs, even in the plastics field, that we won't tackle.

However, where injection or compression molding is involved, "John Dear" had a point. For over 30 years we have successfully met and combatted tough molding assignments for manufacturers who built their business on quality and would take nothing less than the best.

BOONTON MOLDING CO.
BOONTON, NEW JERSEY
N. Y. Office—Chanin Bldg., 122 East 42nd Street, Murray Hill 6-8540



NEW CUMBERLAND GRANULATOR HAS LARGE 6"x10" THROAT OPENING!

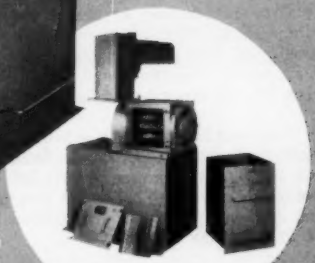


Model 10

DESIGNED FOR USE BESIDE EACH INJECTION MACHINE

Cumberland's new Model 10 granulating machine fills the urgent need for a high-quality granulator with a large throat opening to be used beside each injection molding machine.

Like all Cumberland machines, the new Model 10 is rugged, efficient, and easy to clean. And you'll appreciate its attractive price.

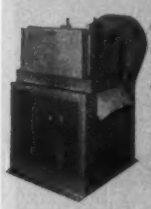


Dismantled View

SPECIFICATIONS
Throat opening: 6" x 10"
Motor: 3 HP, 1800 rpm
Floor space: 24" x 36"
Shipping weight: 1200 lbs.

Write for further information.

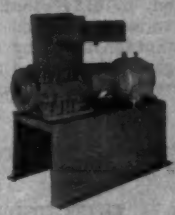
CUMBERLAND



ROTARY CHOPPING MACHINE

Heavy duty, rugged machine. Used for cutting thick vinylite slabs from two roll mills. Also used as large capacity pelletizer. Other applications are described in Bulletin 400.

CUMBERLAND



GRANULATING MACHINE MODEL 18

Large capacity. Double hung construction. Easy to inspect, dismantle, and adjust. Further details are in Bulletin 250.

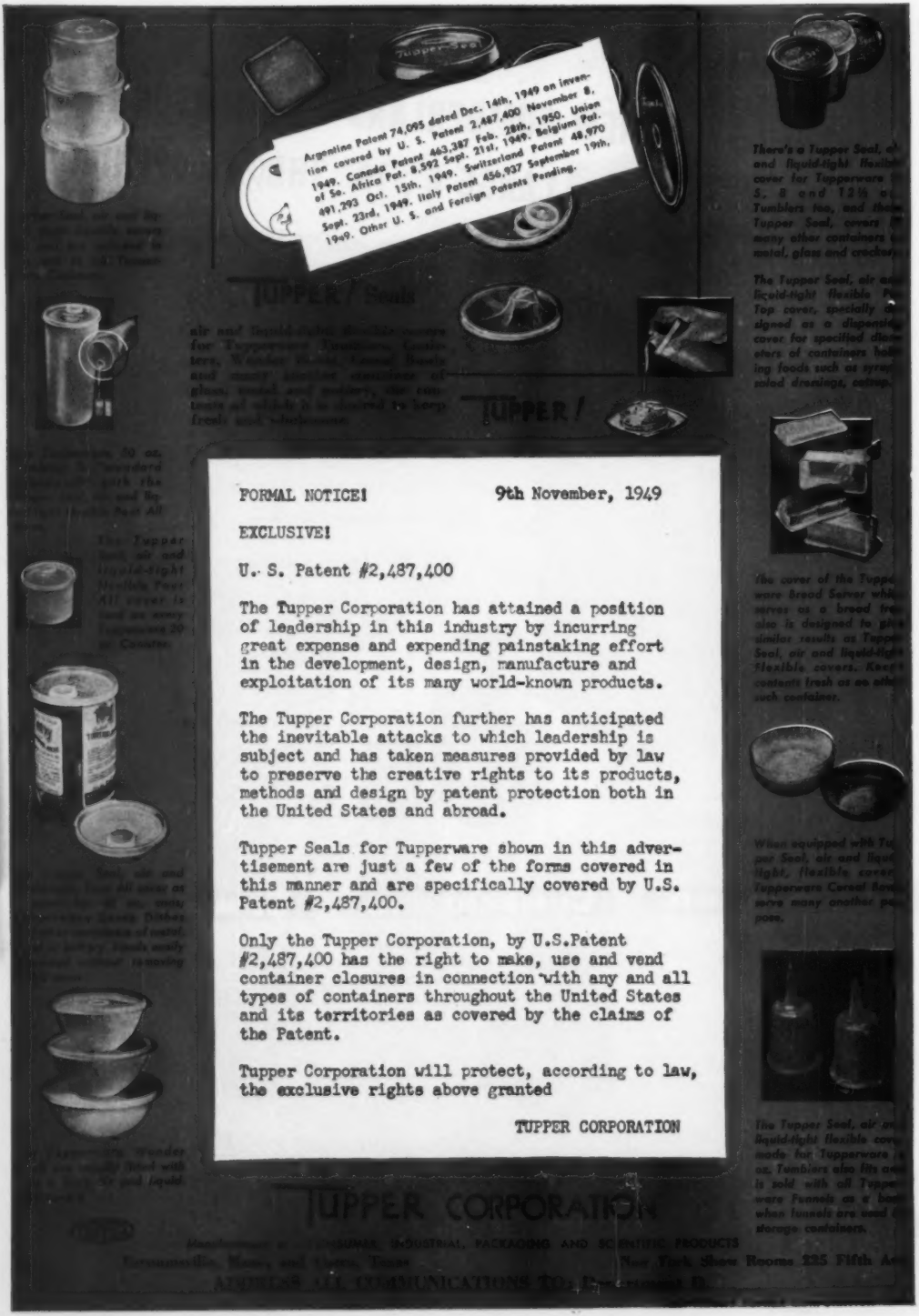
CUMBERLAND

GRANULATING MACHINES MODELS 0, ½, 1½

Small and medium capacity. Designed specifically for plastics. Rugged and easy to clean. Request Bulletin 250.

CUMBERLAND Engineering Company Inc.
BUILDERS OF BETTER MACHINES FOR THE PLASTICS INDUSTRY
DEPT. I - BOX 216 - PROVIDENCE - RHODE ISLAND

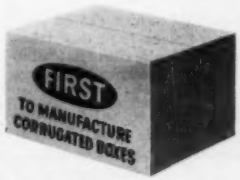
California Representative:
WEST COAST PLASTICS DISTRIBUTORS, INC.
2323 Jesse Street, Los Angeles 23, Cal.


Argentine Patent 74,095 dated Dec. 14th, 1949 on invention covered by U. S. Patent 2,487,400 November 8, 1949. Canada Patent 463,387 Feb. 28th, 1950. Union of So. Africa Pat. 8,592 Sept. 21st, 1949. Belgium Pat. 491,293 Oct. 15th, 1949. Italy Patent 456,937 September 19th, Sept. 23rd, 1949. Other U. S. and Foreign Patents Pending.
TUPPER Seals
TUPPER
FORMAL NOTICE! 9th November, 1949
EXCLUSIVE!
U. S. Patent #2,487,400
The Tupper Corporation has attained a position of leadership in this industry by incurring great expense and expending painstaking effort in the development, design, manufacture and exploitation of its many world-known products.
The Tupper Corporation further has anticipated the inevitable attacks to which leadership is subject and has taken measures provided by law to preserve the creative rights to its products, methods and design by patent protection both in the United States and abroad.
Tupper Seals for Tupperware shown in this advertisement are just a few of the forms covered in this manner and are specifically covered by U.S. Patent #2,487,400.
Only the Tupper Corporation, by U.S.Patent #2,487,400 has the right to make, use and vend container closures in connection with any and all types of containers throughout the United States and its territories as covered by the claims of the Patent.
Tupper Corporation will protect, according to law, the exclusive rights above granted
TUPPER CORPORATION
There's a Tupper Seal, air and liquid-tight flexible cover for Tupperware
Tumblers too, and these Tupper Seal, covers
The Tupper Seal, air and liquid-tight flexible
Top cover, specially designed as a dispensing
The cover of the Tupperware Bread Server which
When equipped with Tupper Seal, air and liquid-tight, flexible cover,
The Tupper Seal, air and liquid-tight flexible cover
is sold with all Tupperware Funnels as a base
TUPPER CORPORATION
New York Show Rooms 225 Fifth Ave

This H & D corrugated display box makes barbeques extra fattening—for sales figures!

The customer is "just looking for a fork to roast hot dogs"—until she spies this gay yellow and black display, with its clever Hamburgrill and its Cube Steak Broiler. Then her picnic menu suddenly expands beyond "just wieners"—and sales figures expand beyond "just forks for roasting hot dogs."

H & D package action can increase profits on *your* products, too, by such grouping of related items for tie-in sales, or by giving better display . . . providing secure protection . . . increasing multiple sales. Write for H & D's 11-volume "Little Packaging Library." Hinde & Dauch, 5101 Decatur St., Sandusky, Ohio.



H&D®

HINDE & DAUCH

Authority on Packaging

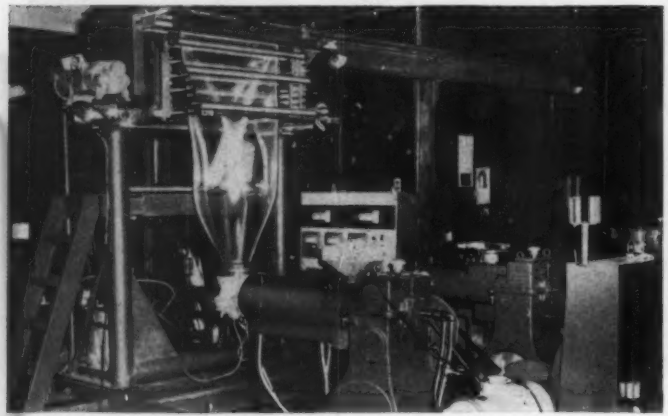
FACTORIES IN: Baltimore • Buffalo • Chicago • Cleveland Detroit • Gloucester, N. J. • Hoboken, N. J. • Kansas City, Kan. Lenoir, N. C. • Richmond, Va. • Sandusky, Ohio St. Louis • Watertown, Mass. *Offices in principal cities.*

PLASTICS MACHINERY BULLETIN

Reporting News and Machine Design Developments

IN BUSINESS TO NRM REDUCE YOUR COSTS

NEW EQUIPMENT EXTRUDES THERMO-PLASTICS FILM AND THIN-WALL EXPANDED TUBING



NRM thin-wall expanded tubing installation with 2½" electrically heated extruder, 8" die and 48" vertical haul-off.

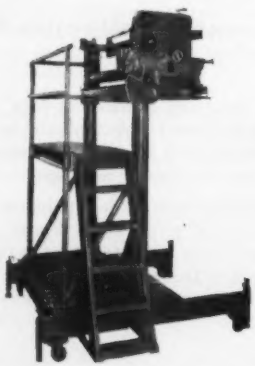
A complete installation for the extrusion of thin-wall expanded polyethylene and PVC tubing for wall thicknesses from .001" up is now available.

Dies of 8", 15" or 20" diameter can be fitted to 2½", 3½", 4½" or 6" extruders. The flattened width of the tubing is dependent on the diameter of the die. The flattening idler roll arrangement of the 48" haul-off can handle lay-flat tubing up to 42" wide. Other designs for tubing up to 66" are also available.

The special single-arm spider die is electrically heated, and has zoned-temperature control which is well balanced.

The vertical haul-off, which can be provided with trimmer knives, has a dual take-up. It is held rigidly in place on retractable jack screws, and easily rolled out of the way on casters.

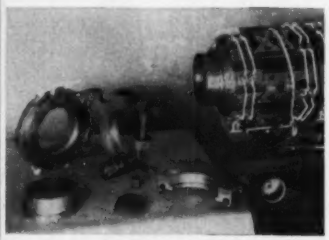
For detailed information, write Plastics Machinery Division, National Rubber Machinery Company, Akron 8, Ohio.



NRM 48" vertical haul-off for thin-wall expanded plastic tubing. Has variable-speed drive, including flattening idler roll arrangement, adjustable trimmer knives and dual take-up.

New Nylon Extruder

NRM now offers a simplified rugged split front flange arrangement holding a standard die gate or PVC crosshead which can be removed readily and replaced with a band heater. The split flange is provided with hinge lugs and two swing bolts.



NRM 2½" Model "50" die gate, sub-die, strainer plate and split-type front flange as removed from cylinder front end of a 2½" extruder. A nylon crosshead or nylon die can now be bolted direct to the cylinder face.

When the flange is removed the small *Nylon* die or *Nylon* crosshead is bolted directly to the face of the cylinder. This avoids critical temperature variations resulting from heat losses of the flange.

INDICATES EXTRUDER SPEEDS

With installation of a special tachometer, adaptable to all NRM extruders, you can now have an accurate indication of screw speeds at all times. A tachometer generator mounted on the gear housing over the input shaft is connected to an indicating dial conveniently mounted close to the feed hopper.

For complete details, write Plastics Machinery Division, National Rubber Machinery Company, Akron 8, Ohio.

NATIONAL RUBBER MACHINERY CO.

General Offices & Engineering Laboratories Akron 8, Ohio

PLANTS at Akron and Columbiana, Ohio and Clifton, N. J.
AGENTS East: National Rubber Machinery Co., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Calif.
EXPORT Plastics Machinery: OMNI EXPORT CORPORATION
460 4th Ave., New York 16, N. Y.

Creative Engineering

Clock frames molded by General Products Company, Inc. for Sessions Clock Company.

3 steps to multiple colors at fractional costs

with Monsanto Lustrex Styrene plastic

Sessions Clock Company applies the first rule of profitable selling... a good product, attractively made... by *lacquering* bright, "three dimensional" COLORS on the back of clock frames made of crystal Lustrex styrene plastic.

Monsanto has developed a wealth of material on lacquering, printing, decorating, metallizing, destaticization and annealing of styrene molded parts. It's in booklet form...and is *yours* for the asking.

In addition to Lustrex styrene, Monsanto produces numerous other plastics materials... in fact, the broadest range of plastics in the industry. So, whatever your materials problem, the chances are there's a Monsanto plastic that can *best* help you. Lustrex: Reg. U. S. Pat. Off.

For full information on the versatile properties and advantages of Monsanto's broad range of plastics—and for your booklet on after-treatment of molded styrene parts—mail the handy coupon. ↓

MONSANTO
CHEMICALS—PLASTICS

SERVING INDUSTRY... WHICH SERVES MANKIND

MONSANTO CHEMICAL COMPANY,
Plastics Division, Room 2601, Springfield 2, Mass.

☐ Please send me information on Monsanto's family of plastics.
☐ Please send me the booklet on, "After-treatment of Styrene Molded Parts."

Name & Title _____

Company _____

Address _____

City, Zone, State _____

TIMELY BENEFITS FROM TITANOX RESEARCH:

Plastics that *Stay* bright outdoors...

Increased weather resistance for colorful cellulose acetate and butyrate toys—new vinyl floor mats and hundreds of other plastic articles—is promoted through the use of TITANOX-RA-NC the "non-chalking" rutile titanium dioxide. In plastics used outdoors, this rutile titanium dioxide is often preferred when initial whiteness or color must be retained after weathering. Characteristically, the exceptional physical and chemical stability of TITANOX-RA-NC make it compatible with almost every type of plastic. Our Technical Service Department is always available to help you with your problems in pigmenting plastics. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 1; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Ltd., Montreal 2, and Toronto 1.

8749

TITANOX

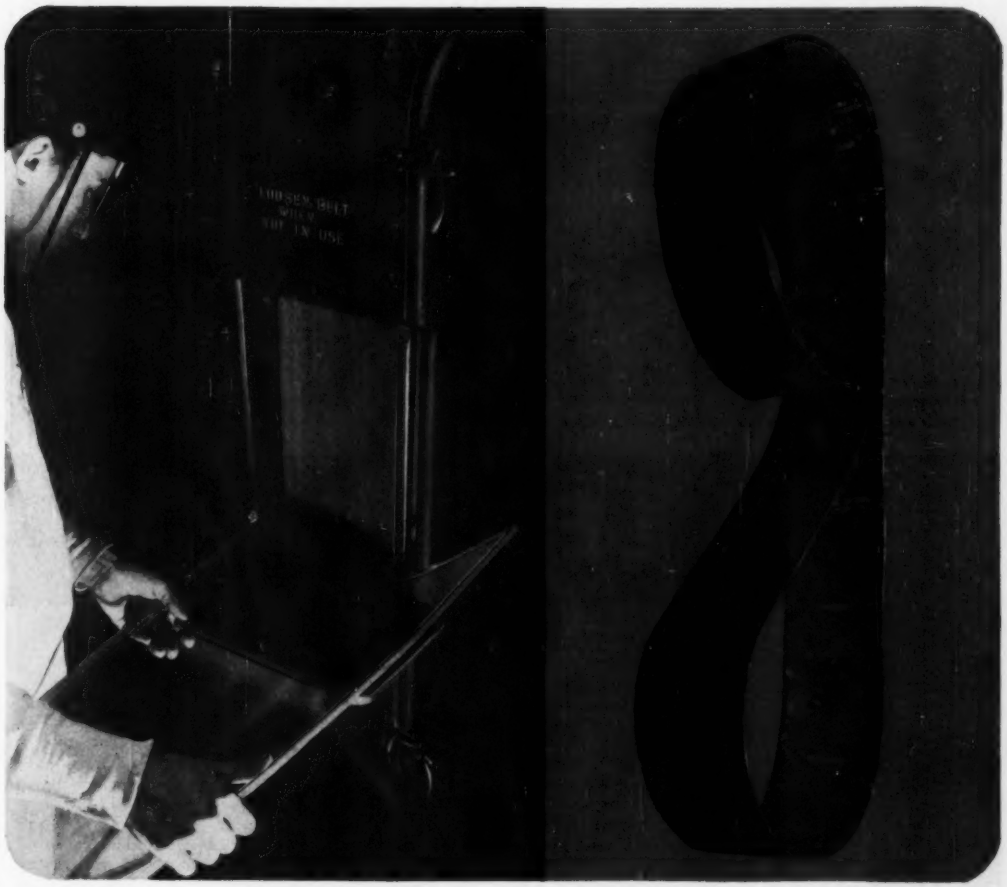
the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

Efficient and Economical with Added Safety

Waterproof Cloth Belts by CARBORUNDUM provide outstanding efficiency, economy and safety in plastic sanding and finishing. A constant cutting rate is maintained throughout belt life. With no backing imperfections and with "wet stretch" retarded, smooth-running operation is assured. Finer work pieces are produced. Wetting down of plastic dust and elimination of "splice throb" are additional safety features. Your CARBORUNDUM representative will be glad to give you full details.



Coated Abrasives by

CARBORUNDUM

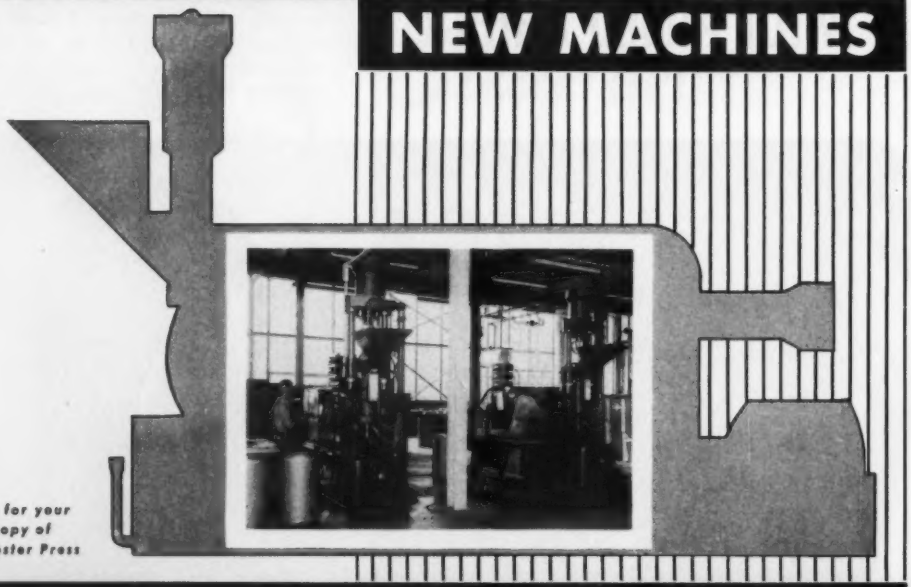
TRADE MARK

Making ALL abrasive products . . . to give you the proper ONE

"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company, Niagara Falls, N.Y.

NEW PLANT

NEW MACHINES



Write for your free copy of the Lester Press

ALL LESTERS...

Another "exclusively Lester" shop—Plastic Masters, Inc. of New Buffalo, Michigan! The first Lester Injection Molding Machines were delivered to their beautiful new plant in June, 1950. And from the beginning they have achieved consistently fine results with the machines. But, in addition to that, they have received the kind of assistance that every Lester-Phoenix customer has discovered to be a part of our sales policy.

As a result of this complete cooperation in installation, service and maintenance, by January, 1951, there will be six Lester machines (ranging in capacity from 12 to 20 ounces) in operation in their plant.

So, when you check the specifications, remember that with each Lester machine comes a generous portion of the most valuable feature of all—the desire to cooperate with you in every possible way.

LESTER INJECTION MOLDING MACHINES

distributed by LESTER-PHOENIX, INC., 2621 CHURCH AVENUE • CLEVELAND 13, OHIO

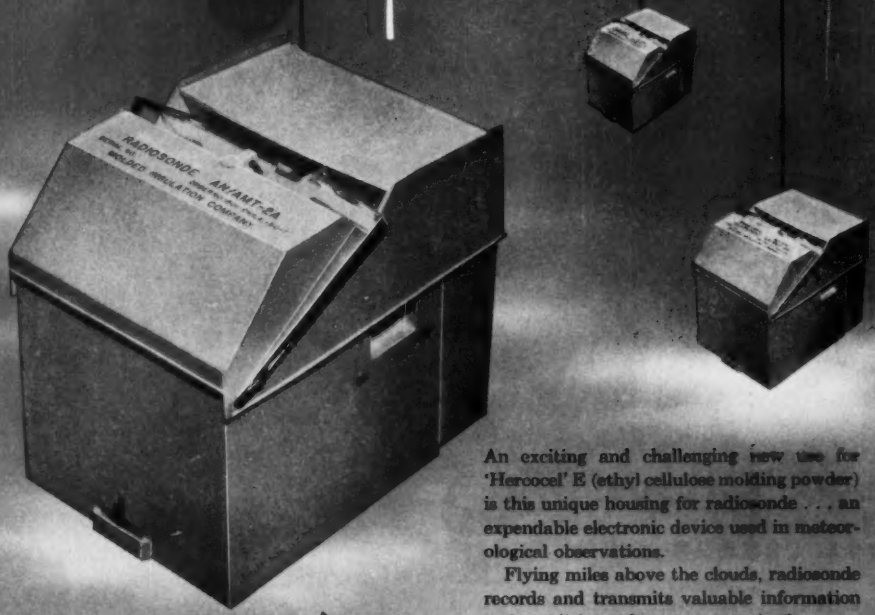
REPRESENTATIVES

New York . . . . . Steven F. Krould
Detroit . . . . . Thereson-McCosh
Chicago . . . . . J. J. Schmidt
Cleveland . . . . . Don Williams
Cincinnati . . . Index Machinery Corp.
Los Angeles . . Seaboard Machinery Co.
San Francisco . . . . . J. Fraser Rae
St. Louis, Milwaukee . . . A. B. Geers
New England . . . Kavanagh Sales, Inc.

FOREIGN

Toronto, Canada . Modern Tool Works, Ltd.
London, England . . Dowding & Doll, Ltd.
Calcutta, India . . Francis Klein & Co., Ltd.
Sydney, Australia . . Scott & Holladay, Ltd.
Japan, New York . . W. M. Hewitt, Inc.

What's Up WITH HERCOCEL* E?

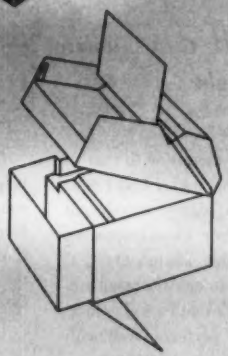


An exciting and challenging new use for 'Hercocel' E (ethyl cellulose molding powder) is this unique housing for radiosonde . . . an expendable electronic device used in meteorological observations.

Flying miles above the clouds, radiosonde records and transmits valuable information on humidities and temperatures in the upper strata of atmosphere. The accuracy of weather forecasts and the security and efficiency of plane flights depend on its reports. Radiosonde's accuracy, in turn, owes much to the tough and durable plastic housing which protects its delicate mechanism.

What's up in your new product picture? Have you any plastics problems which might be solved with 'Hercocel' E? Our technical staff invites your inquiries.

Complete radiosonde housing is a complex assembly of precision-molded, thin-wall parts. In addition to good form retention and lightweight strength, use of 'Hercocel' E also gives sealed resistance to chemicals and solar radiation, makes possible storage for long periods under adverse conditions of temperature and humidity. Molded and Manufactured by Molded Insulation Company, Philadelphia, Pennsylvania.



HERCULES POWDER COMPANY
INCORPORATED
916 Market Street, Wilmington, Delaware

HERCULES Cellulosic Plastics

*TRADEMARK

CP51-1

PROTECTION for her...

EASY DISPERSION for you...

—when you use "Dutch Boy" PLUMB-O-SIL C to stabilize translucent vinyl stocks against heat and light

PLUMB-O-SIL C is the newest addition to the "Dutch Boy" line of stabilizers for vinyl chloride polymers and copolymers.

Plumb-O-Sil C is a coprecipitate of lead orthosilicate and silica gel. It brings you the excellent stability and other advantages of lead silicate-silica gel complexes *plus a hitherto unattained degree of dispersibility.*

Its easy dispersibility pays off in easier processing. No longer is there any need for you to pre-disperse the stabilizer in your plasticizer.

And since its refractive index of 1.58 coincides so closely with that of vinyl chloride compounds (1.58-1.60), you're sure of a highly translucent product. In addition to guaranteeing translucent stocks, Plumb-O-Sil C makes it possible to achieve good stability in deep shades and vivid colors, for this stabilizer performs well with the majority of dyes and colorants.

Like all "Dutch Boy" products, Plumb-O-Sil C is backed up by the solid reputation of the maker — National Lead Company — assurance of a uniform quality, a stable product, a steady supply.

Our technical staff will be glad to help you stabilize vinyl resins for any use. Write for complete information on Plumb-O-Sil C or any other stabilizer in the ever-expanding "Dutch Boy" line.

Dutch Boy PRODUCTS

Reg. U.S. Pat. Off.

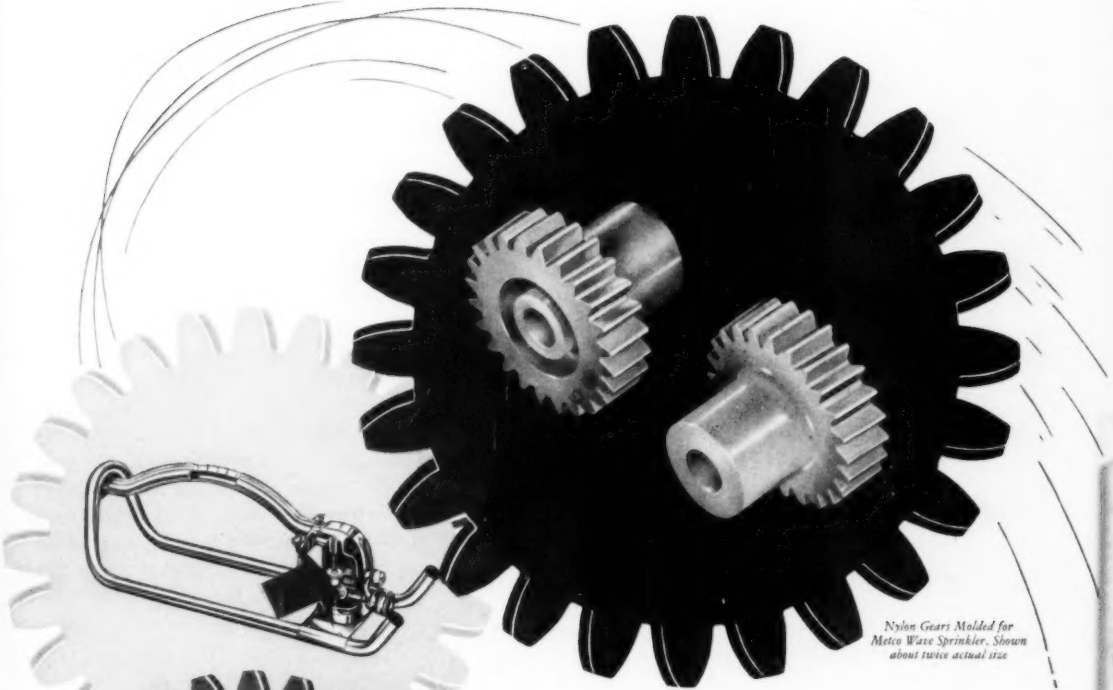
Dutch Boy

Reg. U.S. Pat. Off.

CHEMICALS

NATIONAL LEAD COMPANY

111 Broadway New York 6, N.Y.



Nylon Gears Molded for Meteo Wave Sprinkler. Shown about twice actual size

Skillful Molding

DOES A WELL GEARED JOB

". . . For long life with low wear, a non-metallic gear was a design requirement for the Meteo Wave Sprinkler. We chose molded gears for economy and because of the wide range of materials which can be molded. We chose nylon as the molding material because of its high wet strength, low moisture absorption and abrasion resistance when operated with water as the only lubricant."

This excerpt from a letter by Mr. C. K. Wilson, Design Engineer for Metallizing Engineering Company, Long Island City, New York, effectively presents a strong case for molded gears.

If Mr. Wilson had continued in that vein, he might also have said, "We chose Elmer E. Mills Corporation because it is one of the few molders in the country equipped to mold nylon gears."

Why? Because this type of thermoplastic molding presents a challenge few molders care to meet. Since these were undercut "helical" gears instead of the straight "spur" gears, their production presented an unusually difficult job of molding and tool making. Despite the fact that only a few molders can make them, the use of thermoplastic gears is very much on the increase.

Wherever they are used, it is either a case of greater production economy, functional superiority, or both.

So when you are studying the problem of gears for your products, consider the advantages of nylon or other thermoplastic gears. Then let us show how well geared we are to solve this problem for you.

Write on your letterhead for the new Injection Molded and Extruded Plastics Catalog. Or, for detailed information about CHEM-TRONIC piping, tubing and fittings, write for circulars containing data and illustrations.*

**Trademark Registered*

ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Fibestos, Lucite, Nylon, Plexiglas, Polystyrene, Styron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Cerex, Fortical, CHEM-TRONIC*, Saran, and other Thermoplastic Materials.

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

MPc molded plastics

Makes a good case

FOR THIS RADIO-PHONOGRAPH

BY RCA VICTOR

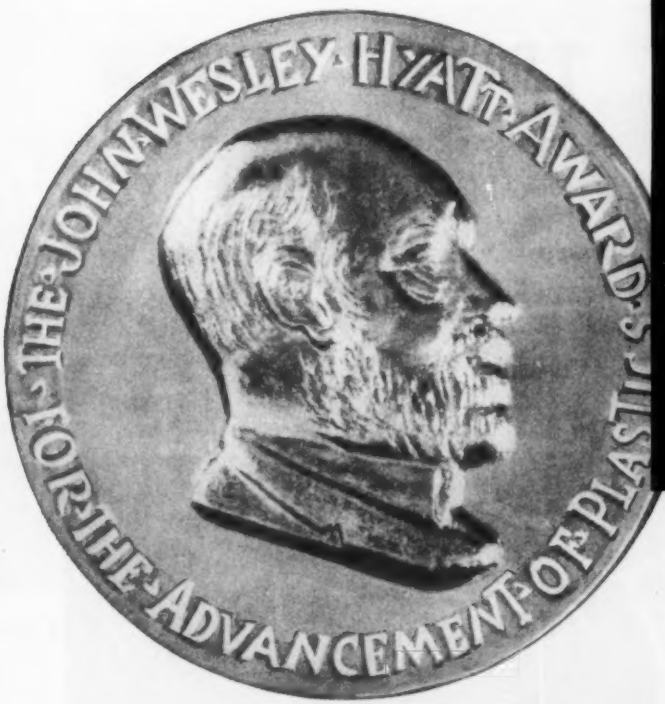
What made this RCA Victor radio-phonograph an over-the-counter success? First, its two-for-one value ...combining the radio and record player in one neat, compact package. Second, the eye-appeal of its trim, smartly styled design. Third, its more-for-your-money price tag.

In achieving all three of these sales-winning virtues, the **MPc**-molded cabinet played a major part. Molded plastics inexpensively produces the complicated shape needed to house the dual mechanism. Plastics adds color...sleek lines...mold-perfect finish. Ingenious mold design cuts assembly costs by providing molded-in openings for dial and controls, as well as cored studs to take self-tapping assembly screws.

And in this case, the inventive use of plastics can often lift a product above competition. Making plastics perform to *your* commercial advantage is our business, here at **MPc**. Submit your plastics product or problem to Molded Products Corporation, 4535 W. Harrison St., Chicago 24, Ill.

PLASTICS DIVISION
MOLDED MPc PRODUCTS
CORPORATION

nominations are now being accepted



The John Wesley Hyatt Award

tenth annual award

The John Wesley Hyatt Award is offered annually for outstanding achievement in the field of plastics. The Award is made by the Committee to that individual who in its opinion made the greatest contribution in 1950 to the progress of the plastics industry. The winner receives the John Wesley Hyatt Gold Medal and $1,000.

To be eligible, nominees need only be connected with the plastics industry. For example, chemists, laboratory technicians, toolmakers, molders, executives are typical qualifiers. Any number of entries may be submitted. There is no entry fee.

Statements of qualification (entry blanks) are now in the mail to the industry. Additional blanks or further information may be obtained from the Committee Secretary, William T. Cruse, 295 Madison Avenue, New York 17, N. Y.

1941—**DR. DONALD S. FREDERICK**
Rohm & Haas Company
Philadelphia, Pennsylvania

1942—**MR. FRANK SHAW**
Shaw Insulator Company
Irvington, New Jersey

1943—**DR. STUART D. DOUGLAS**
Carbide and Carbon Chemicals Corporation
South Charleston, West Virginia

1944—**MR. WILLIAM ILER BEACH**
North American Aviation, Inc.
Los Angeles, California

1945—**MR. VIRGIL MEHARG**
Bakelite Corporation
Bound Brook, New Jersey

MR. PAUL ZOTTU
Electronic Heating Equipment Mfg. Co.
Cambridge, Massachusetts

1946—**DR. JOHN J. GREBE**
Dow Chemical Company
Midland, Michigan

1947—**MR. JOHN D. COCHRANE, JR.**
The Formica Company
Cincinnati, Ohio

1948—**DR. GEORGE T. FELBECK**
Carbide and Carbon Chemicals Corporation
New York, N. Y.

1949—**GEORGE M. POWELL, III**
Union Carbide and Carbon Corporation
South Charleston, West Virginia

CP51-2

Windsor's

NOW BRINGS YOU

TRIPLE SCREW EXTRUDER RC-200

produces 200 pounds per hour

Nothing like it before . . . ever. Nothing matches its power, nothing matches its versatility, nothing matches the productive capacity of "Windsor's" RC-200 triple screw extrusion machine.

outperforms

outproduces — outmodes

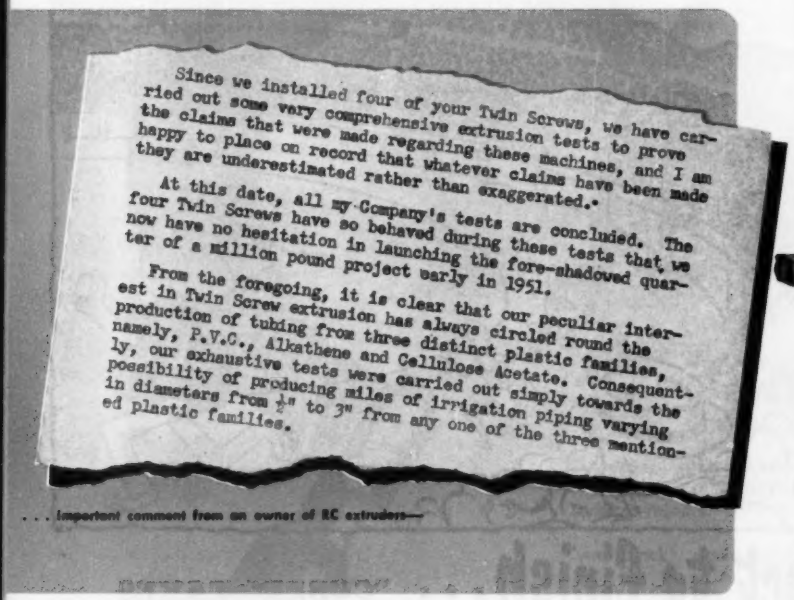
conventional extrusion machines

Three interacting screws—a revolutionary advance in extruding machine design and manufacture—equip Windsor's RC-200 with a production capacity and versatility that is almost beyond belief. Powered by an eighteen horsepower drive, the compact, short-barreled RC-200 is substantially constructed and produces wide sheeting, molding pellets, cross sections, belting and unusual crosshead extrusions at notably high rates—up to 200 pounds per hour.

The triple screws of the RC-200 provide mixing action of unmatched intensity. In one low-cost pass the machine colors, compounds and extrudes many products. At the hopper end, in go resins, colorants, plasticizers and fillers. Out from the die issue close tolerance finished extrusions. The cost of operation is solely for compounding and coloring. In many instances the extrusion of a finished shape is a *no-cost bonus*.

Without a doubt, Windsor's RC-200 is the most productive and versatile extruder of its size which can be purchased. It performs functions no other extrusion machine can. Ownership and operation will result in both pride and profit.

most advanced extrusion machines produced anywhere in the world



Since we installed four of your Twin Screws, we have carried out some very comprehensive extrusion tests to prove the claims that were made regarding these machines, and I am happy to place on record that whatever claims have been made they are underestimated rather than exaggerated.

At this date, all my Company's tests are concluded. The four Twin Screws have so behaved during these tests that we now have no hesitation in launching the fore-shadowed quarter of a million pound project early in 1951.

From the foregoing, it is clear that our peculiar interest in Twin Screw extrusion has always circled round the production of tubing from three distinct plastic families, namely, P.V.C., Alkathene and Cellulose Acetate. Consequently, our exhaustive tests were carried out simply towards the possibility of producing miles of irrigation piping varying in diameters from ½" to 3" from any one of the three mentioned plastic families.

. . . important comment from an owner of RC extruders—

RC-65

THE TWIN SCREWS
RC-65 and RC-100
EXTRUSION MACHINES

- Compounding
- Plasticizing
- Coloring
- Scrap Reclaiming

Low operating and power costs. Produces from .010" monofilaments to 10" tubes, strips and special sections. Built to American Standards of Performance.

a size for your needs

You will want to learn more about these remarkable multiple screw units: the unusual extrusions they make, their ease of operation, their many automatic features, their extremely moderate cost. Your inquiry will bring a prompt response.

	RC-200	RC-100	RC-65
Number of screws	**3**	2	2
Diameter of screws	**4.72**	4.33	3.15 - 3.54
Average output	**200 lb./hr.**	100 lb./hr.	66 lb./hr.
Motor			
horsepower	**18**	10	5
speeds	**variable from 6-20 rpm**	variable from 6-20 rpm	3-speed (6, 9, 12 rpm)
Shipping weight (approx.)	**5685 lb.**	2685 lb.	2185 lb.
Floor space extruder	**5' 6" x 6' 6"**	3' 6" x 3' 6"	2' 6" x 3' 6"
control panel	**2' 3" x 2' 3"**	2' 3" x 2' 3"	2' 3" x 2' 3"
Hopper Feed	Fully automatic, rotating type . . . geared to screw speeds		
Lubrication	Forced-feed to all gears and bearings		
Foundations	None required		

RC-100

Exclusive distributor within the territory of the U.S.A.

JACKSON & CHURCH COMPANY
Saginaw, Michigan

All inquiries for the British Empire and South America (Brazil excluded) to . . .

R. H. Windsor Ltd.

MANUFACTURERS UNDER L.M.P. PATENTS
16 FINSBURY SQUARE LONDON E.C.2 ENGLAND
Telegrams TECHNIMACH FINSQUARE LONDON * Cables TECHNIMACH LONDON

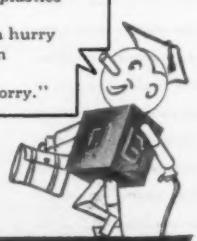
from start to finish... "CUBEE" TAKES COMPLETE CONTROL OF YOUR PLASTICS PROBLEMS

"Cubee" does a complete job . . . when you use our services you get the benefit of the *entire* organization working on your problem — designers, die makers, molding machine operators — everyone. You see, we have all the services available to you to help you solve your problems.

Five of the key people here have a total of more than 75 years of experience in this business — and remember, this is a relatively new field. That's a lot of know-how — and it's yours for the asking. Let "Cubee" take over *your* plastics problems — from Start to Finish.

Q-B Says:

"Cubee solves your plastics puzzle.
And he does it in a hurry
Just toss the job in Cubee's lap
And eliminate a worry."



2658 WEST 12th STREET, ERIE, PA.

Branch Offices

MR. HARRY R. BRETHEN
11341 Woodward Avenue
Detroit, Michigan
Townsend 8-2577

PARAGON SALES COMPANY
111 S. 22nd Street
Philadelphia 3, Pennsylvania
Rittenhouse 6-5609

DEPENDABLE

as your

"mike"

Dependability saves Production Time and Money, reduces rejects. Only Gering (color specialists from 'way back) could have conceived and produced DRYCOL . . . the dependable dry color powder for in-your-plant use. You specify DRYCOL in any of 17 Bureau of Standards colors; or you order special colors. DRYCOL is dust-free, compact, economical . . . in units to color 50 to 100 lbs. of styrene in any mixing drum . . . ready to mold. Send for free sample packet to color 100 lbs.

Quick, on-the-spot coloring

of CRYSTAL STYRENE

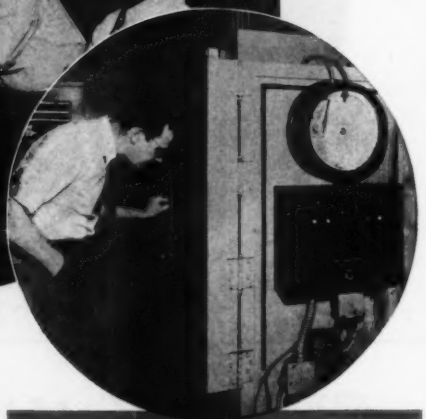
GERING *Products Inc.*

KENILWORTH, N. J.

Erie Plans Carefully

and Tests Relentlessly . . .

Conference of engineers, production and sales managers over blueprints for new product.



to Give You the Best in Custom Injection Molded Plastics

ERIE has had longer experience in the field of custom injection molding than any other company. ERIE engineers know their plastics and what can be done with them, and have blazed new trails in molding methods. Every new product is gone over thoroughly and in detail, in the "blueprint stage," and dies are designed for most efficient production.

But even expert theory is not accepted as final proof. Your product is subjected to rigorous testing for the conditions it must meet in actual use, in a laboratory in which every such condition is accurately simulated. Whether specifications call for the withstanding of extremes of temperature and humidity, resistance to warpage, precision of dimensions, or other qualifications, scientific quality control methods and equipment give you assurance that the molded products you receive will be up to every required standard.

One of a series of advertisements describing Erie Resistor's complete facilities for quality custom molded plastics.

Plastics Division

ERIE RESISTOR CORP., ERIE, PA.

LONDON, ENGLAND . . . . TORONTO, CANADA

PLENCO PHENOLIC MOLDING POWDERS

PLENCO PHENOLICS

. . . black, browns, mottles and colors in General Purpose, Heat Resisting and Medium Impact grades. Special Purpose Molding Compounds and Resins are produced to fulfill special molding requirements.

• Day in, day out use by leading molders who are engaged in large scale production is the best testimony which can be offered for Plenco Phenolics. Employed widely by compression and transfer molders for parts ranging from small components to giant size castings, Plenco Phenolics are performing with outstanding success.

DESIGNED-IN VERSATILITY

Plenco Phenolics are notable for the immense range of special properties with which they can be supplied. Currently in use are Plenco Phenolics with heat resistant, impact resistant, deep draw and controlled dielectric characteristics. Television console cabinets weighing 45 pounds are being molded with custom compounded Plenco Phenolics which provide the proper flow needed to fill the large cavities.

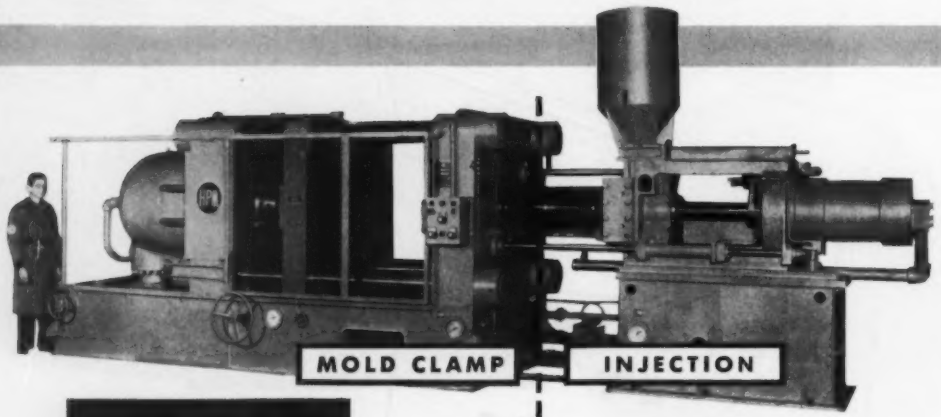
If your's is a problem requiring the development of a phenolic material with unusual characteristics, depend on Plenco Phenolics—consistently uniform, proven in use and approved by molders. Write us about your requirements.

PLASTICS ENGINEERING CO.

Sheboygan, Wisconsin

H-P-M'S NEW 60-A INJECTION MACHINE:

60 ozs. today....



HERE'S HOT NEWS FOR BIG PLASTICS

2 UNIT DESIGN

In the H-P-M "60-A", mold clamp and injection are two distinct units. This H-P-M design is your guarantee against obsolescence because it provides for easy conversion to larger injection capacities without change in the heavy mold clamp and base.

● Here is equipment you can put to work today with assurance it will handle your "shot" capacities of tomorrow! This H-P-M exclusive development makes the conversion of this new 60 oz. machine to 200 ounces a simple matter. The H-P-M 200 ounce pre-plasticizing conversion injection unit can be quickly installed . . . you still utilize the original all-hydraulic mold clamp and power unit (the big portion of your equipment dollar). There's real economy in this non-obsolescent design.

But look at these additional features which make the H-P-M "60-A" today's best buy . . . twice the injection speed of conventional 60 oz. machines . . . all hydraulic components mounted outside of the base for easy accessibility . . . full hydraulic 1000-ton mold clamp (no toggles, pins or links) with large platens (60" x 40" mold size) . . . ample clamp stroke for those deep draw jobs (36") . . . plenty of

HPM

THE HYDRAULIC PRESS MANUFACTURING CO.

Makers of Presses for Metal Working and Processing Industries • Plastic Molding Presses

WITH H-P-M'S CONVERSION UNIT:

200 ozs. tomorrow!

A 60 ounce H-P-M at Cruver Mfg. Company, Chicago, molds large TV "windows".

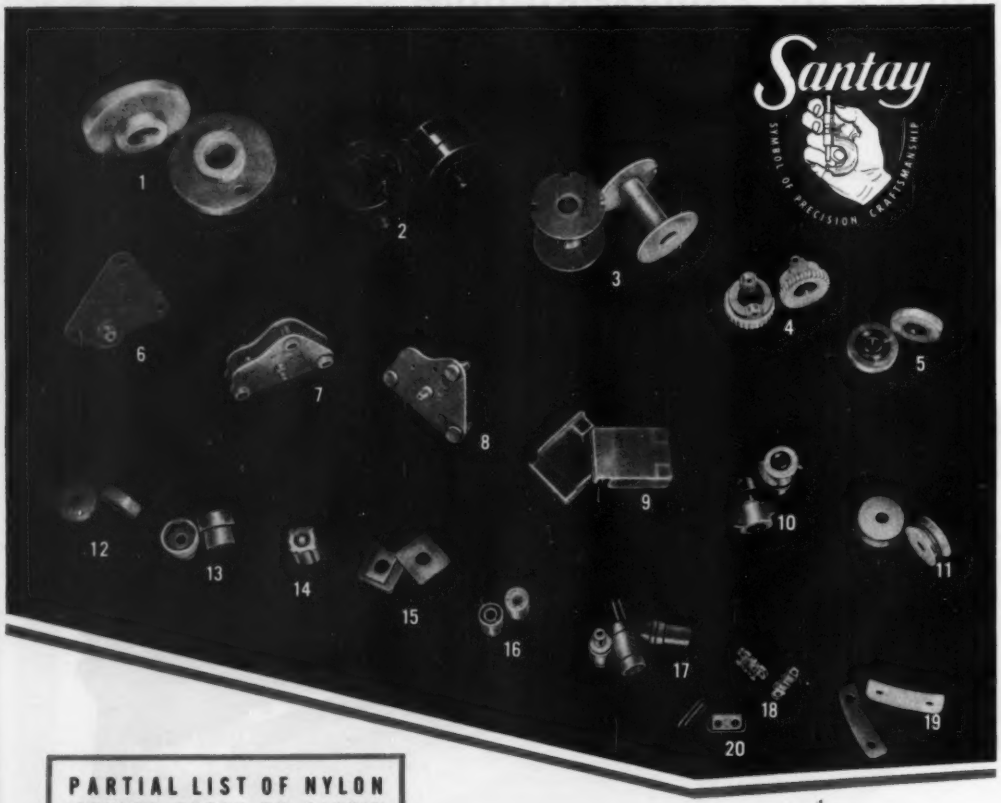
daylight for those big molds (60") . . . retractable injection unit for easy accessibility to sprue bushing and heat cylinder . . . efficient plasticizing chamber (300 lbs./hr.) . . . low center line requiring no platform or pit . . . add it all up and you can understand why the country's biggest molders are installing H-P-M's . . . typical 60 oz. users are G. E., G.A.T.X., Santay, Cruver, Consolidated Molded, Federal Tool, Associated Plastics and Victory.

Remember . . . when you buy the H-P-M "60-A" you buy the most for your dollar today with insurance for the future. Call in a nearby H-P-M engineer or write for complete specifications.

H-P-M STANDARD SIZES: 9, 16, 32, 60 AND 200 OZS. PRE-PLASTICIZING CONVERSION UNITS FOR 9, 16 AND 60 OZ. SIZES.

1010 **Marion Rd., Mt. Gilead, Ohio, U.S.A.**

• Die Casting Machines • Hydraulic Pumps, Valves and Power Units.



PARTIAL LIST OF NYLON MOLDED PARTS BY SANTAY

1. *Gear Blank for Camera*
2. *Ink Pad Wheel for Electronic Timer*
3. *Bobbin for Timer Mechanism*
4. *Drive Ratchet for Typewriter*
5. *Gear Blank for Camera*
6. *Outer Gear Plate for Electric Timer*
7. *Assembled Gear Plate . . for Electric Timer*
8. *Inner Gear Plate for Electric Timer*
9. *Dust Cover for Radio Induction Coils*
10. *Cam Coupling for Typewriter*
11. *Window Roller*
12. *Gear Blanks for Camera*
13. *Crisper Guide for Refrigerator*
14. *Check Valve Cap for Tractor Oil Pump*
15. *Slide Fall Arm Support for Refrigerator*
16. & 17. *Insulator Connector Pin, Tee Pin, Tee Socket for Aircraft.*
18. *Hearing Aid Connector*
19. *Latch Plate for Record Changer*
20. *Terminal Board for Record Changer*

NYLON Injection Molded by SANTAY

Injection Molding of NYLON has been developed to an unusually high degree of perfection by SANTAY craftsmen. Here, under the watchful eyes of an *extremely skillful* staff, *every* operation from tooling to finishing is completed with remarkable speed and efficiency. The most modern precision methods and machinery together with superior Nylon compositions assure finest uniform quality at low cost. If an extremely accurate, tough, light weight Nylon part may prove the solution to one of YOUR problems, by all means discuss it with a Santay engineer. Get all the advantages that only 30 years of thermoplastics pioneering and research can bring! Write today.

SANTAY CORPORATION

355 NORTH CRAWFORD AVENUE, CHICAGO 24, ILLINOIS

INJECTION MOLDING • METAL STAMPING • ELECTRO-MECHANICAL ASSEMBLIES

"no more GAMBLING on tool steel selection"

[½ actual size; Selector is in 3 colors]

Since the first announcement, hundreds of tool steel users have received their CRUCIBLE TOOL STEEL SELECTORS. The comments received indicate that this handy method of *picking the right tool steel right from the start* is going over big.

"Handiest selector I've ever seen"

"No more gambling on tool steel selection"

"You're right, the application should dictate the choice of the tool steel" . . . and many, many more favorable comments.

You'll want your CRUCIBLE TOOL STEEL SELECTOR. It uses the only logical method of tool steel selection—begin with the application to pick the right steel! And the answer you get with one turn of the Selector dial will prove satisfactory in every case, for the CRUCIBLE TOOL STEEL SELECTOR covers 22 tool steels which fit 98% of all Tool Steel applications. ALL the tool steels on the Selector are in Warehouse Stock . . . that means when you get the answer, you can get the steel . . . fast!

Write for your Selector today! We want you to have it, because we know you've never seen anything that approaches your tool steel problems so simply and logically. Just fill out the coupon and mail. Act now! CRUCIBLE STEEL COMPANY OF AMERICA, Chrysler Building, New York 17, N. Y.

Here's how it works:

To use the Selector, all you need know is the characteristics that come with the job: type and condition of material to be worked, the number of pieces to be produced, the method of working, and the condition of the equipment to be used.

FOUR STEPS—and you've got the right answer!

1. Move arrow to major class covering application
2. Select sub-group which best fits application
3. Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
4. Select tool steel indicated

That's all there is to it!

Here's an example:

Application—Deep drawing die for steel

Major Class—Metal Forming—Cold

Sub-Group—Special Purpose

Tool Characteristics—Wear Resistance

Tool Steel—Airdi 150

One turn of the dial does it!

And you're sure you're right!!

Crucible Steel Company of America
Dept. MO, Chrysler Building
New York 17, N. Y.

Gentlemen:

Sure! I want my CRUCIBLE TOOL STEEL SELECTOR!

Name_____ **Title**_____

Company_____

Street_____

City_____ **State**_____

CRUCIBLE first name in special purpose steels

TOOL STEELS

fifty years of Fine steelmaking

Branch Offices and Warehouses: ATLANTA • BALTIMORE • BOSTON • BUFFALO • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DENVER • DETROIT HOUSTON, TEXAS • INDIANAPOLIS • LOS ANGELES • MILWAUKEE • NEWARK • NEW HAVEN • NEW YORK • PHILADELPHIA • PITTSBURGH • PROVIDENCE ROCKFORD • SAN FRANCISCO • SEATTLE • SPRINGFIELD, MASS. • ST. LOUIS • SYRACUSE • TORONTO, ONT. • WASHINGTON, D. C.

THAT CRITICAL MOMENT IN THE LIFE OF YOUR PRODUCT

...when Choice *is the Deciding Factor*

It's *always* a critical moment when there's a choice to be made . . . in marriage, or in manufacturing when a relatively new material like plastics *first figures* into your production plans.

Because at that point—*at the very start*—the RIGHT CHOICE of an injection molder is vital to *your product.*

That's why it's so important to wed with the technical know-how and molding facilities of an *experienced* custom injection molder like PYRO . . . who has the reputation for leadership in *quality* molded plastic parts and products.

PYRO'S team of experts . . . engineers, designers, model makers, molders, finishers, inspectors . . . are the *best* in the *field.* And they're *at your service!*

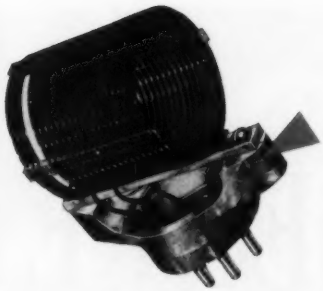
So . . . when your plans call for plastics, call in PYRO *right at the outset.* For efficiency, economy, design ingenuity, . . . for the solution of your plastic problems . . . it's PYRO

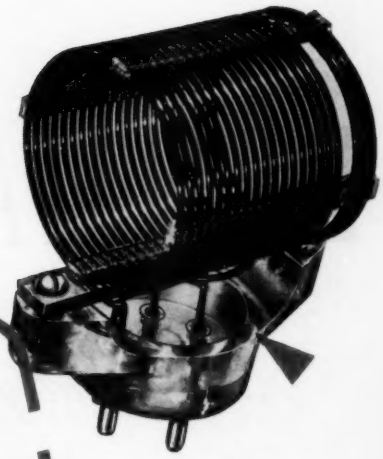
PYRO *at Your Service*
CONSULTATION
Technical—Merchandising—Packaging—Premiums

PRODUCT CREATION and DESIGN
ENGINEERING
RESEARCH and DEVELOPMENT
MOLDING

Starting point for a Better Product

Pyro PLASTICS CORPORATION
UNION, NEW JERSEY





Costly breakage

REDUCED

BY CHANGING TO

KOPPERS POLYSTYRENE

Base of this plug-in coil is injection molded from Koppers Polystyrene 81. Manufacturer: Bud Radio, Inc., Cleveland, Ohio. Molder: Nylon Molded Products Corp., Cleveland.

● Bud Radio, Inc., Cleveland, Ohio, solved two troublesome problems in the manufacture of these plug-in coils for radio transmitters by changing the coil base to Koppers Polystyrene **81.**

"We have found Koppers Polystyrene especially suited to our purpose," says A. N. Haas, company president. "We no longer have the problem of breaking or cracking that was all too common with a porcelain base.

"In addition, we find that the problem of bent or distorted pins has been completely eliminated. With a porcelain base, it was necessary to spin the pins in the base. But the use of Koppers Polystyrene permits them to be molded into the base."

Excellent electrical properties, low cost, light weight and good moisture resistance are other advantages of Koppers Polystyrene in this particular application.

No matter what you are making, it will pay you to investigate the economy and moldability of Koppers Polystyrene.

KOPPERS

Koppers Perfected Plastics

Koppers Polystyrene has made Many Products Better and Many Better Products Possible.

KOPPERS COMPANY, INC., Chemical Division, PITTSBURGH 19, PA.

SALES OFFICES: NEW YORK • BOSTON • PHILADELPHIA • CHICAGO • DETROIT • LOS ANGELES

PERMANENCE

...of friendly customer relations is Columbia's most prized asset

Columbia

CUSTOM MOLDERS OF PLASTIC PRODUCTS AND SPECIAL PLASTIC PACKAGING

COLUMBIA PROTEKTOSITE COMPANY • Carlstadt, New Jersey
New York Showrooms: Empire State Bldg.
West Coast Office: 380 Bayshore Blvd., San Francisco, Calif.

ONE OF AMERICA'S LEADING MANUFACTURERS OF SUN GLASSES, COMBS, BRUSHES, TOYS, HOUSEWARES

Seconds Count for $

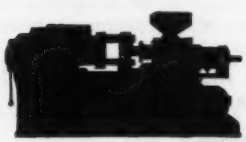
Even a fraction-of-a-second advantage can mean quoting more profitable prices. F-L exclusive machine design superiority ... rapid advance injection plunger, 'Speed-Flo' heating cylinder, faster warm-up, quick set-up for production runs ... mean the seconds saved that make every Fellows machine earn more money for each and every user.

The F-L 1B-3-15

Hottest 3-OUNCE MACHINE ON TODAY'S MARKET!

For 3-ounce record-breaking performance

1B-3-15



For 8-ounce sustained high capacity

5C-8

Since its introduction 2 years ago, this Fellows machine has swept the market like wildfire. It's still setting production records with injection molders from Maine to California. On single-cavity molds, operating at 'Hot Molding' speed, production on the 1B-3-15 is comparable to multiple cavity molds without danger of wasting critical plastic materials.

Today, the Fellows 1B-3-15, tried and proved in use, is far ahead in cycling speed, automatic operation, and overall machine economy. If seconds will pay off in your molding operations, investigate the details now. Call your nearest Fellows office.

Fellows
LEOMINSTER
injection molding equipment

THE FELLOWS GEAR SHAPER CO., Plastics Machine Div., Head Office & Export Dept., Springfield, Vt. Branch Offices: 616 Fisher Bldg., Detroit 2. 640 West Town Office Bldg., Chicago 12 • 2206 Empire State Bldg., New York 1 • New England Distributor: Leominster Tool Co., Leominster, Mass.

functional design centers around Aico molded plastics

WHEELDEX CARD FILE
offers greater efficiency and ease in handling index and reference cards of all kind. Its 4 Aico Molded Plastic parts are injection molded of Tenite II material. Balanced production of all four parts is assured by Aico's extensive molding facilities.

The adaptability and versatility of Aico Molded Plastics has simplified many widely diversified design problems. The Wheeldex Card File is a good example of how Aico Molded Plastics lend themselves to economical, rapid production . . . eliminate costly machining and finishing operations. Aico engineers rely on their 35 years experience to make practical recommendations on the proper use of plastics. Don't hesitate to discuss your problem with Aico. We'll give you our straight-from-the-shoulder advice on whether or not Aico Molded Plastics will improve your product. Get in touch with us today.

AMERICAN INSULATOR CORPORATION
New Freedom, Pa.

Many things are better because of Aico **MOLDED PLASTICS**

MODERN PLASTICS

VOLUME 28 JANUARY 1951 NUMBER 5

MATERIALS IN 1950 AND THE FUTURE

THE plastics industry consumed approximately 30% more synthetic resin and cellulosics (including plasticizer, pigments, and filler) in 1950 than in 1949. It is estimated that the total amount shown by the government figures will be over 1.6 billion pounds in comparison to around 1.1 billion pounds in 1949. This figure is derived by omitting all the protective coating figures (except for vinyl where they can't be isolated from the total) and adding filler to the vinyls in those categories where the government lists figures for solid resin only.

The resins used for protective coatings in 1950 will go more than 500 million pounds, thus bringing the total use for synthetic resins well over 2 billion pounds. However, since the paint, lacquer, and varnish business is a separate industry, quite distinct from plastics, its consumption of resins is not generally included in a review of plastics activities.

The big push in plastics materials production started back in October, 1948, and has increased almost month by month ever since, although at the time this is written, it is possible that slight declines may be evident in November and December, 1950, due to raw material shortages. An unusual event in the upward trend was the high level production maintained in the summer months, when, like most other industries, plastics usually decline. Indeed, the industry broke all records in August, generally one of the lowest operating months, when it consumed plastics at a 2 billion-pound annual rate.

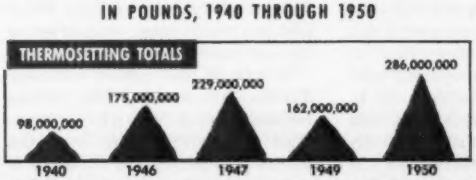
The maintenance of high production in ordinarily slack months interfered seriously with attempts by producers to build up reserve stocks of raw materials for anticipated business increases which normally occur in the fall and winter. As a result, the producers were not too well prepared to meet the heavy fall demand. Plastics, like nearly every chemical on the market, became a scarce commodity—so scarce, in fact, that when the government cut back civilian usage of aluminum by 35% in November, plastics processors disgustedly and painfully snorted at published newspaper stories that molded and extruded plastics would be used as replacements.

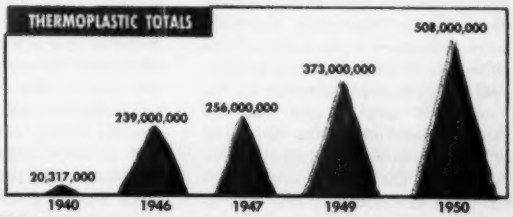
Strangely enough, with the exception of polyethylene products, there were no particularly big developments in the use of new plastics products to account for the big upsurge. The public simply demanded more plastics products of already established lines.

Furthermore—and again with the exception of polyethylene—there had been no great volume of plastics channelled into war or defense projects up to the end of the year. There are plans under way and the impact will be felt, probably starting about the middle of 1951, but it is very doubtful if more than 10% of plastics output is going into defense production at present. Excessive civilian demand has been the key factor in plastics scarcities up to the present time. There would have been little or no scarcities in raw materials if Mr. and Mrs. Average Citizen hadn't decided to "blow" their savings, cash their war bonds, spend the last cent of their weekly earnings, and buy up to the hilt. Even before Korea, the country had gone on a spending splurge. This might well have ended disastrously before the end of the year, but the threat of war and the approach of a jillion-dollar defense program kept the wheels turning. Plastics just naturally swung with the tide.

But to say that the defense program had no effect on plastics other

PRODUCTION OF MOLDING AND EXTRUSION MATERIALS[a] IN POUNDS, 1940 THROUGH 1950





[a] Includes filler. Sources: U. S. Census Bureau; U. S. Tariff Commission; MODERN PLASTICS estimates.

Table A—Consumption of Natural Rubber and Production of Synthetic Rubber in the United States Since Pre-War Years, In Long Tons*

Year	Natural rubber Consumption	GR-S production	Other synthetic production
1939	592,000	.....	1750
1941	775,000	227	7887
1945	105,429	719,404	100,948
1946	277,597	613,408	126,618
1947	562,661	407,769	100,933
1948	627,332	393,880	94,463
1949	574,522	295,166	98,524
1950	(first 6 mos.)		
	361,000	114,000	42,000
	(last 6 mos. estimate)		
	350,000	210,000	.....

* Source, Rubber Statistical Bull., Vol. 4, No. 10, July 1950, London

than to increase sales would be false. In some cases the sales might have been even larger if the threat of war hadn't clogged some of the plastics supply lines.

First Blow to Styrene

The first and loudest creak in the plastics supply line came last February when the price of natural rubber began to shoot upward, but it was certainly augmented on that June day when the Communists invaded South Korea. Polystyrene, which was even then on voluntary allocation by most of the producers, has been growing more difficult to obtain in desired quantities ever since. One reason is that styrene monomer is needed for synthetic general-purpose rubber (GR-S) as well as for polystyrene.

Probably a greater reason for the polystyrene stringency has been an unprecedented demand. Production approached 250 million pounds in comparison to 184 million in 1949, yet it wasn't enough to satiate the hungry maws of injection presses (see page 94) capable of operating around the clock five or six days a week. Production of molding material increased from a low of 16 million pounds in February to almost 25 million in September, yet there were estimators in the industry who claim that 30 million pounds or more could have been absorbed by the industry in each of the last six months. Some idea of the immensity of this growth may be gained by recalling that the largest month's consumption (October) in 1949 was 19 million, and the monthly average was around 15 million pounds. Thus, molders used more than 33⅓% more polystyrene in 1950 than in 1949, but if their claims are to be believed, they could have used 100% more.

The above figures are evidence enough to show why there was so much hue and cry about polystyrene scarcity. In such circumstances, there are certain to be complaints about hoarding, but what is hoarding? If a two- or three-months supply is hoarding, there might be some justification for complaint, but not many molders could hoard much more than that—their presses were too busy to permit accumulation of surplus stock. It is easy to understand why molders fear the threat of a cutback in 1951 to their 15- to 20-million-pound usage in 1949, but that amount of polystyrene is certainly enough to keep hundreds of presses in operation.

Polystyrene Increases

The big 1950 increase in polystyrene was spread out among all types of applications, but the most spectacular growth is estimated to be in the ever-increasing size of molded pieces. Refrigeration parts and equipment; housewares; wall tile; novelties, toys, and premiums; and television parts were the leading products. The refrigerator industry, which built somewhere near 6.6 million units in 1950 in comparison to 4.45 million in 1949, is reported to be planning a 20% cut in 1951 due to lack of steel, copper, motors, and other parts. The television industry, which produced something like 7.25 million sets in 1949, will probably suffer an even greater decline in 1951 than refrigerators, due to lack of electronic parts and partial conversion to defense equipment.

Regulation W, which restricts credit limitations on appliances, is also expected to hold down sales volume. Wall tile and some other household items may also decline, since the number of houses built in 1951 is expected to be less than 800 thousand as against more than a million in 1950.

Polystyrene may be shifted from these items to others for which there will still be strong demand, but the amount involved is a matter of doubt. In refrigerators, for example, the amount of polystyrene used per unit is increasing so that a smaller number of manufactured refrigerators might use an even greater amount of polystyrene. The declining trend in the above named items may not show up immediately, but is almost certain to appear by the second quarter of 1951 unless the government slows down its defense program.

Furthermore, there is as yet no foreseeable demand for large quantities of polystyrene in the military mind to take up this possible slack —if one develops. It seems possible, therefore, that molders who are not working on items curtailed by the metal shortage or Regulation W will have a fair amount of material with which to work; perhaps a quantity equal to or a little better than 1949 production will come close to meeting their desires. This is not too satisfactory for recent purchasers of presses who want to keep their equipment operating at full scale capacity in order to pay for their investment, but nevertheless, allowances should be made for this unusual period of uncertainty in any financing plan that is likely to strain the company budget.

Styrene and Rubber

However, the one phase of polystyrene supply that makes molders more jittery than anything else is the synthetic rubber program which requires such large quantities of styrene monomer.

A look at the rubber situation, therefore, becomes required reading for any plastics man who is interested in understanding why the amount of polystyrene available is tied in with the amount of GR-S

rubber produced. Every pound of that rubber requires from 0.23 to 0.30 pound of styrene monomer. In war time the amount of styrene required was frequently 0.27 pound for every pound of tire rubber. Today it is about 0.235. Other synthetic rubbers such as butyl, nitrile, and neoprene do *not* require styrene.

Table A, p. 56, gives a quick review of what has been happening to rubber in the United States since pre-war days, and certainly points out its vital role during World War II, when the major portion of the world's natural rubber production was shut off from Uncle Sam. The table also indicates how the government cut back synthetic production after the war until early in 1950 when prices for natural rubber began to rise, and war clouds cast ominous shadows.

It is expected that synthetic rubber will supply 80% of the new rubber used in the United States until the end of the present emergency. Great quantities of natural rubber will be stockpiled. It is still a necessity for heavy-duty tires, particularly the type used by trucks and military mobile units. The price of GR-S rubber—18½¢ for many years—was recently raised to 24½¢, but natural rubber has risen from around 16¢ in October 1949, to over 80¢ spot prices in November of 1950. This price rise has resulted in unprecedented shipments of natural rubber from Asia to even above the record 1,487,500 tons produced in 1949.

Furthermore, despite the high price and record production, natural rubber is a scarce commodity, partly due to government stockpiling and partly due to unprecedented demand in other countries where natural rubber has been bought in record-breaking quantities that will exceed the 863 thousand tons consumed in countries other than the United States in 1949. That was by far the greatest consumption ever recorded abroad.

How Much Rubber?

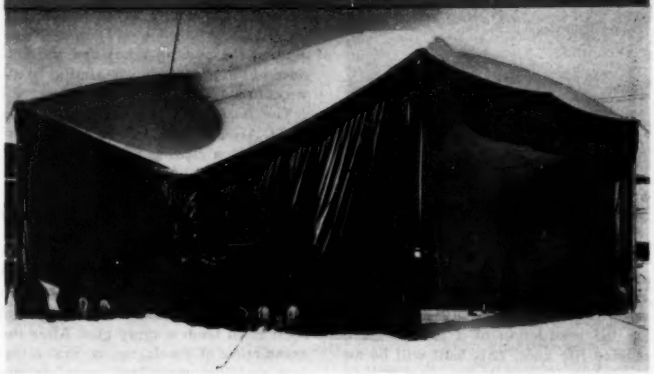
Rubber has joined steel, coal, and petroleum as one of the world's most important commodities. No country can be secure in this dangerous political era in which we are now living without an adequate supply of these basic industrial sinews with which to build a defensive armor. The only point for debate seems to be: "How much do we need for security purposes?"

The plastics industry has been squeezed in more ways than one in this giant coil of rubber.

First squeeze was in the styrene monomer situation. Styrene plants for the original rubber program were designed for an annual 300-million-pound (150 thousand-short ton) capacity which, with butadiene, could be converted into something over 600 thousand long tons of rubber. But, like many chemical operations, it has been found that the originally designed capacity could be operated at a rate far greater than anticipated. Styrene monomer has been produced at a rate of almost 50 million pounds a month in the latter half of 1950, or double the wartime rate. Some technicians say that 650 million pounds can be produced annually with present facilities. If the monomer industry operates at a 50 million-pound monthly rate, the amount of styrene available for rubber and styrene plastics would be that shown in Table B, p. 59.

The figures given are, of course, very rough, and many persons insist that a steady output figure of 50 million pounds of styrene monthly is indeed optimistic. As a result, the reader will have to do his own juggling of the figures to meet his own point of view. For example, highest

VINYL-COATED FABRIC PLANE SHELTER



VINYL-COATED fabric is used in the manufacture of a quickly erectable fighter plane shelter now being tested by the Navy Bureau of Aeronautics and the Air Materiel Command prior to adoption for Air Force use.

The shelter, made by General Textile Mills, was designed primarily for use in the Arctic. It is air-transportable and is used for maintenance and repair work on fighter planes where no hanger facilities exist. It provides an 18-ft. door clearance and a working area 45 ft. square with no internal supports or obstructions. This is roomy enough to hold the largest Navy and Air Force fighter planes in use and still provide adequate working space for maintenance men and equipment.

The shelter weighs only 4824 lb., but will withstand a 70-mile-an-hour wind and a snow load of 30 lb. per square foot. Only about 64 man-hours of unskilled labor are needed to erect the shelter.

Four corner poles and five roof trusses made of aluminum serve as a frame for the shelter. The fabric covering which fits over this frame is held in place by taut steel cable anchor and guy lines.

The inner liner of the shelter is made of glass cloth in order to provide the best possible insulation. The vinyl-coated fabric which makes up the main cover of the shelter has an aluminized interior which reflects heat and light.

Although designed for the Arctic primarily, the shelter can be used in any climate. When it is erected in the tropics or other insect-ridden areas, plastic screens can be added. Light and heat connections to external power sources are also provided.

REINFORCED-PLASTIC LIFE BOAT

THE United States Coast Guard has recently placed an educational contract for the production of a low pressure molded life boat. This boat will be an absolute replica of the standard 26 by 8 ft. double-end wooden life boats now used by the Coast Guard. In fact, the mold, pictured above, was produced directly on the outside surface of a standard wooden life boat. The mold itself is a thin shell of Fiberglas and polyester resin.

A standard wooden life boat was shipped to the plant of the low pressure molder, Lunn Laminates, Inc., Glen Cove, N. Y., where it was prepared for the production of the mold by first carefully sanding the surface smooth and then waxing with five coats of butcher's wax. The next operation was to coat the outer surface of the boat with a parting agent known as Higlow, manufactured by Western States Lacquer Corp., Los Angeles, Calif. The lay-up of impregnated mat was then placed directly against the parting agent and the balance of the procedure was similar in all ways to standard bag molding.

The boat mold is used as a female mold. After the application of the parting agent, a coating of filled and grey pigmented resin is sprayed on the inner surface of the mold. The lay-up, consisting of tailored patterns of Fiberglas mat, is then built up. The outside layers (those placed directly against the walls of the mold) are first impregnated with Laminac. Additional layers are laid up dry and subsequently coated with resin from a spray gun. After the completion of the layup, normal oven-bag molding operations complete the cure.

The entire boat with the exception of the floor will be plastic laminate. This includes the stringers and keel. All timbers, as well as the seats and gunwales, will be molded hollow and filled with expanded cellulose acetate as a flotation element.

These life boats are scheduled to be shipped to the Arctic for testing under the severe climatic conditions encountered there. If they stand up under the rough usage to which they will be subjected, they will become standard for Coast Guard use.

The low pressure molded life boats will weigh approximately one-half as much as the standard wooden life boats, and no problems of upkeep should be encountered.

styrene production of any month reported as this is written is 50 million pounds, but producers seem confident it will go higher—if the benzol and ethylene needed are available. Some producers claim there is enough of these two materials in sight to meet the needs of capacity operation. Several companies are reported to be planning construction of new styrene capacity but it is hardly likely that such new capacity will come into production until late in 1951.

Getting the rubber program into full swing takes time. The 35 thousand-ton monthly goal had not quite been reached in September. Production is scheduled to reach 60 thousand tons in January, and around 63,500 tons in March or April. A lot of people don't think it will reach that goal. Even if styrene is available, there may not be enough butadiene and other necessary chemicals by that time. But if a monthly production of 60 thousand tons is reached, and imports continue at a rate of 72 thousand tons (including latex), rubber will be available in quantities of 132 thousand tons monthly, or 1.6 million tons for a year.

One government regulation attempts to reduce rubber consumption to 90 thousand tons a month. If that regulation is enforced (industry used 118 thousand tons in October), there would be 42 thousand tons a month for stockpiling, but the government objects strenuously to anyone guessing what is or will be put in stockpile. Dr. R. P. Dinsmore, vice president in charge of research and development for Goodyear Tire & Rubber Co., Inc., and war-time research director of Rubber Reserve, says that the United States would require one million tons of rubber a year in wartime, and, at the very least, 25% should be natural. He thinks it would require another one or two year's supply to provide enough stock for a war of four or five year's duration.

Production vs. Stockpiling

Many plastics industry people feel that the goal for synthetic rubber production is far too high, and that rubber will be bouncing all over the lot with no one to catch it by late 1951, especially if automobile production should drop from 8 million units in 1950 to 4 million in 1951, which many economists say will happen. But the stockpilers are silent on the subject. They are no doubt governed by advice from the Defense Department—the hunch is that they won't again risk criticism for the so-called puny amount in stock and will take every pound they can get for lay-away.

There is much talk about cutbacks in use of rubber for non-essential items but, despite all efforts in the last war, there was little success in completely eliminating its use in so-called non-essentials. The saving wouldn't be too big anyhow. The saving, if any, will have to come largely from—many people believe—a reduction in tire manufacture which now absorbs 65% of all rubber consumed.

This styrene-rubber situation is probably the "iffiest jangle" that ever hit the plastics industry. The above statements are chock full of "ifs", and there are many more "ifs" involved. If tests now under way prove favorable, the percentage of styrene used in rubber may be reduced. Or a rubber using only butadiene may come into production. Other rubbers such as butadiene-acrylate copolymers and even copolymers of vinyl compounds with butadiene may cut into the picture. But the trouble is that all of these things are still some distance in the future and the need of the industry is immediate.

Other Styrene Uses

Another factor that must be considered is the amount of styrene used in plastics other than polystyrene. In the Tariff Commission figures (Table C, p. 60) these are listed

as miscellaneous, exclusive of protective coatings. They include high styrene-butadiene copolymers, styrene-acrylonitrile-rubber mixtures, polyester, and ion exchange resins. Due to the various ways in which these are reported to the Tariff Commission by different manufacturers, these figures are somewhat confusing. Some of them are reported in other parts of the total such as "Miscellaneous Synthetic Plastics" at the bottom of the table. The figure of 50 million pounds total seems extremely high, even though filler and all the styrene latices are included. A few million pounds off could be significant at this particular time but, nevertheless, this figure is large enough to indicate that great quantities of styrene are going into these compounds—twice as much as in 1949.

A great portion of this quantity is for high-styrene-butadiene compounds which generally contain about 85% styrene. Estimators say that as much as 15 million pounds of styrene may have been used for this purpose in 1949. The compound is used largely in combination with rubber for floor coverings, and in Neolite-type shoe soles. This type shoe sole is now being examined by the Armed Services for possible use in soldiers' shoes.

Other styrene-butadiene compounds are used with rubber for molding and sheeting purposes. Other copolymers such as styrene-acrylonitrile are beginning to make their presence felt in the injection molding industry where they are noted for high impact strength. Tumblers, pipe, fountain pen barrels, and other such applications are listed in the molding powder figure and should not be considered as part of the disputed 50 million-pound figure. Ion exchange resins used for water purification and numerous industrial purposes are based largely on styrene and have been selling at the rate of several million pounds a year. It is easy to see that almost all of these materials may find an important place in the preparedness program.

Still another use for styrene is the styrene-butadiene emulsion used for paper-sizing and in protective coatings—in the famous water-type paint which has had such tremendous success in 1950, and which in 1949 was produced in the quantity of 18 million pounds, of which about 60% was styrene. The 1950 figure is still an unknown factor. Producers say it must be included in that styrene miscellaneous figure, or the poundage couldn't possibly be so high.

All the above items put together make a sizeable figure. Although how much styrene monomer was actually used in them in 1950 isn't known, their total must be reckoned with by anyone who is trying to estimate how much monomer will be available for polystyrene in 1951.

Polyesters

The styrene based polyesters, which contain about one-third styrene, were manufactured in 1950 in quantities at least three times that of 1949 when 3 million pounds were turned out, according to one producer. Polyesters and glass fibers are in great favor with the Armed Services for such things as boats, construction panels, lockers, sleds, special-type boxes or containers, radomes, armor, airplane fittings, pipe, tubes of various sorts, and a large number of undisclosed items. There has been as yet no particularly large scale production of any of these things—most of them are still in the testing or even developmental stage—so it is anyone's guess as to how far they will go in 1951 for military purposes.

Regardless of the defense program, however, polyesters began to move upward in 1949 with marked improvement in 1950. One company alone used 250 thousand pounds a month over a considerable period. Corrugated sheet for skylights and other structural forms is now claimed to be the biggest outlet. One manufacturer of this sheet has doubled plant capacity and another has tripled. A washing machine manufacturer who pioneered the development of washing machine tubs has evidenced satisfaction by not only increasing the percentage of plastic tubs produced, but has adapted polyesters to other items including dishwashers. Another big washing machine manufacturer has come into the field with a polyester tub.

Polyester pipe is an important item of big volume potential. A large new plant in Oklahoma, another in Newark, N.J., and several old-time polyester veterans have entered this business for what looks like big-volume consumption. Tote boxes for bakeries and textile mills are now in large-scale production, with increasing markets on the way. Aviation and the boat industry—which were the original enthusiasts for polyester—have not grown as anticipated, but are far from dead.

Only the plastics requiring styrene have been considered thus far. But, how about the other thermoplastics? They are in proportionately as great demand as polystyrene, but are also troubled with raw material problems. Furthermore, producers of other thermoplastics have not been particularly eager to take over polystyrene accounts when they have any reason to feel that the customer will switch back to polystyrene as soon as possible.

Cellulosics

Cellulose acetate and cellulose acetate butyrate molding powder production was around 80 million pounds in 1950 in comparison to 56 million in 1949. Materials have been

Table B—Styrene for Rubber and Plastics; Monomer Output 50 Million lb. per Month

GR-S rubber production		*Styrene monomer consumption for rubber*	*Left for plastics*
Monthly	*Annual*		
long tons		*lb.*	*lb.*
35,000	420,000	17,500,000	32,500,000
50,000	600,000	25,000,000	25,000,000
60,000	720,000	30,000,000	20,000,000
63,500	760,000	31,750,000	18,250,000
65,000	780,000	32,500,000	17,500,000

TABLE C—PRODUCTION OF SYNTHETIC RESINS AND CELLULOSICS IN POUNDS

	1946	1949	1950a
Cellulose Plastics[1]			
Cellulose acetate and mixed ester:			
Sheets continuous:			
Under 0.003 gage	7,649,795	7,063,000	12,000,000
0.003 gage and over	7,499,529	7,787,000	11,200,000
All other sheets, rods, and tubes	4,715,401	4,322,000	4,300,000
Molding and extrusion materials	83,204,045	55,889,000	80,000,000
Nitrocellulose[1]			
Sheets	10,932,131	5,611,000	6,500,000
Rods and tubes	7,228,862	1,446,000	1,500,000
Other cellulose plastics[1,2,4]	12,183,113	8,519,000	11,700,000
Phenolic and Other Tar Acid Resins			
Laminating	27,725,337	39,814,000	68,000,000
Adhesives	16,120,513	28,615,000	29,500,000
Molding materials[1]	139,624,466	129,582,000	217,000,000
Miscellaneous (including casting)[4]	58,201,169	52,432,000	62,000,000
Urea and Melamine Resins			
Adhesives	40,797,108	40,826,000	77,000,000
Textile- and paper-treating resins	13,534,368	28,736,000	28,000,000
Miscellaneous (including laminating, molding)[3,4]	35,000,000	46,167,000	69,000,000
Styrene and Styrene Derivative Polymer and Copolymer Resins:			
Molding materials[1]	66,769,321	184,834,000	250,000,000
Miscellaneous uses (including polyesters, but not protective coatings)	n.a.	37,662,000	50,000,000
Vinyl Resins			
Sheeting and film, including safety-glass sheet[1]	52,079,495	161,076,000	222,000,000
Adhesives (resin content)	[8]	11,936,000	18,000,000
Textile- and paper-treating resins[5]	11,673,212	29,473,000	44,000,000
Molding and extrusion resins (resin content)	61,852,162	82,187,000	106,000,000
Miscellaneous uses (resin content)[4]	27,082,895	17,550,000	21,000,000
Miscellaneous Synthetic Plastics and Resin Materials			
Molding materials[1,6]	15,000,000	41,751,000	61,000,000
All other uses[7]	35,689,921	83,796,000	205,000,000
GRAND TOTALS	**573,563,843**	**1,106,874,000**	**1,654,700,000**

Source: United States Tariff Commission.

a Last four months estimated.

1) Includes fillers, plasticizers, and extenders.

2) Includes sheets, rods and tubes, and molding and extrusion materials.

3) Data on resins for laminating and miscellaneous uses are on a dry basis; data on molding materials are on the basis of total weight.

4) Excludes data on protective coating resins.

5) Includes data for spreader- and calendering-type resins.

6) Includes data for acrylic, polyethylene, nylon, and other molding materials.

7) Includes data for some 100 million lbs. of coumarone-indene and petroleum resins plus alkyd, nylon, silicone, and other resins for miscellaneous uses.

8) Included in miscellaneous for year 1946 only.

n.a.) not available.

on allocation for months, and many million pounds more could have been sold if they were available. The peak beyond which the industry cannot seem to go under present conditions is around 8 million pounds a month, although actual physical capacity may be in the neighborhood of 10 or 11 million pounds.

Several shortages hamper full-scale production in this branch of the industry. There is currently an under-supply of cotton linters. Not only was the 1950 cotton crop lower than at any time since the 1870's, but mattress manufacturers were struggling manfully to get a greater percentage of the linters than in other years. As a result, the price for purified cotton linters has risen from 9 to 26¼¢ per pound. Wood pulp has been used in ever-increasing quantities for flake over the last few years, but that too became so tight that Swedish pulp was imported to fill the gap. The long strike in the caustic soda industry last summer also was felt in plastics since caustic soda is a prime requisite in processing wood pulp, and production was severely curtailed when it wasn't available. The wood pulp situation may be somewhat alleviated in the spring when new production comes in from the Celanese Canadian plant.

The demand for acetate flake was so great from the rayon industry that facilities for making flake were unequal to the task of providing for both rayon and plastics. Shortages of ethyl alcohol and phthalate plasticizers needed in the manufacture of cellulosics were additional problems and may well be the most serious handicaps in 1951 to any increase in production. The alcohol shortage stems back to the rubber program, and the plasticizer shortage is caused by a lack of capacity for converting naphthalene to phthalic anhydride. There are from 15 to 30 pounds of plasticizer in every 100 pounds of cellulosic molding material.

Acetate in Defense

Another angle in the acetate picture is its possible use in a defense program. During World War II the percentage used in military applications was moderate—inhibitor strips, gas mask lenses, and civilian items

(*Continued on p. 62*)

Why Benzol?

THE chemical most publicized during the past six months is benzol. It is a basic commodity for the chemical industry. It has been tight almost ever since the beginning of the synthetic rubber program in 1942, yet expansion of facilities to produce more in this country has been very tiny.

Benzol is important to plastics because it is today essential in the manufacture of sufficient quantities of polystyrene, phenolics, polyester-glass laminates, polyester plasticizers for vinyl, most ion exchange resins, and nylon. Other base materials can be used for nylon, but today nylon production would be seriously curtailed if no benzol were available. General purpose synthetic rubber—GR-S—is also dependent on benzol.

Chief production source of benzol now is coal tar acid derived from the coking process in steel plants plus a relatively small amount from merchant plants where coke is a by-product of artificial gas manufacture. Production from these sources is limited to a maximum of 170 million gal. a year. Petroleum-derived benzol is now being produced here at the rate of about one million gal. a month.

The amount of benzol used in various products during 1950 is estimated as follows, in thousand gallons:

Phenol	41,000
Styrene	65,000
Aniline	14,000
Nylon	20,000
DDT	5000
Diphenyls	3000
Maleic anhydride	3000
Synthetic detergents	10,000
Dichlorobenzene	5000
Monochlorobenzene (other than DDT, phenol, and aniline)	5000
Nitrobenzene (other than aniline)	4000
Miscellaneous	12,000
Total	187,000

The conversion factor for styrene is 245 gal. of benzol per ton of styrene. For synthetic phenol the conversion factor is 7.15 lb. of phenol per gallon of benzol. Thus, 65 million gal. of benzol would make 520 million lb. of styrene. How much of this is going for rubber and what may be left for polystyrene can be ascertained from Table B, p. 59. Over 290 million lb. of phenol will be made from benzol in 1950—the balance of the total 325 million-lb. production in 1950 is natural phenol. More than 60% of phenol production is for plastics, and lack of phenol has been a serious handicap to phenolics production in the last few months.

But take a look at the other items in this list. Nearly every one of them is a high-priority item for a defense program. Detergents and DDT, for example, are particular pets of the Armed Services. Other items are indispensable in certain chemicals and explosives needed by Uncle Sam. Take aniline for example. From January 1, 1944, to June 30, 1945, the benzol use for aniline was 22,208,000 gal., and that didn't include government use for explosives—figures on the amount of aniline produced in government plants were never released. Yet aniline consumed only 6% of benzol distribution during the war—it might well consume more in any future emergency.

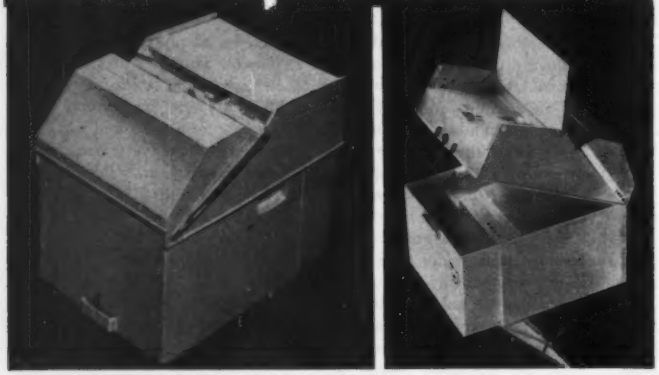
Total consumption of benzol during one war year was 255 million gal., and it is doubtful that rubber consumed more than 45 million gal. of benzol at that time. Benzol distribution at that time was divided as follows:

Aviation gasoline	47.5%
Styrene monomer	19.0%
Phenol	12.0%
Aniline	6.0%
Chlorobenzene	2.5%
Phthalate plasticizer, maleic, resorcinol, adipic acid for nylon, and misc.	13.0%

It is true that aviation gasoline took a big percentage, and that same situation is not likely to exist again, but bombers still require Avgas, and there will probably be at least some benzol demanded for this purpose in any

(*Continued on p. 148*)

EXPENDABLE PLASTIC WEATHERMAN



Photos courtesy Hercules Powder Co.

ETHYL cellulose has replaced a corrugated paper construction in an unusual type of housing—a completely expendable weatherproof housing for a radiosonde.

A radiosonde contains meteorological instruments and a radio transmitter for sending the observations of the instruments to a weather station on the ground. The box which houses the radiosonde has to be durable, weatherproof, and light in weight. The need for compartmentation results in a complex design, and the walls must be thin. But despite the thin wall sections, the housing must have good dimensional stability and must withstand exposures to the broad range of temperatures and humidities which will be encountered as the radiosonde is carried aloft and is exposed to conditions in the upper strata of the atmosphere.

The material chosen for the housing is Hercocel E ethyl cellulose. The housing molded of this material by Molded Insulation Co., Philadelphia, Pa., is 4½ by 6½ by 5¾ in. and weighs less than 10 ounces.

The strength of ethyl cellulose made possible a box with extremely thin walls and thereby reduced the overall size and weight of the unit. The use of this material also resulted in a better sealing off of the transmitter and barometric unit from battery gases. Insulation from solar radiation provided by the Hercocel housing results in increased accuracy of readings.

The housing is molded in four parts: 1) the main piece; 2) a hinged door in the bottom of the main piece; 3) a top cover; and 4) a flat piece which snap-fits into the top cover to shield two terminals on the cover. The cover and the hinged door on the bottom are held closed by metal spring clips which fit into molded-in grooves.

The radiosonde is used for forecasting weather in connection with airplane flights. Thus military operations in the air may greatly increase the use of the expendable housings.

also used by the military, such as tooth-brush handles, were its greatest outlets. But times have changed. If we get into a full-scale war, acetate may well be used in new applications at a rate of one million pounds per month or more; only the planners in Washington can determine the uses and rate.

Acetate usage in the past year has grown not only because of a general increase in demand for all plastics, but has benefitted by intense design and merchandising campaigns by material producers; by a low-cost opaque material that has met wide acceptance; by higher heat and flame resistant materials that have proved highly successful in Christmas tree ornaments, electrical housing appliances, and kitchen cutlery. Butyrate has, as usual, continued to advance in applications where its stability has been highly desirable, but has gained particular acceptance in transparent housings where visibility is desirable and has made definite inroads into the pipe market because of its toughness and non-corrosive properties.

Cellulose propionate—Forticel—was discontinued in 1950, not only because of material shortages and pressure of work on other materials, but because the manufacturer is convinced that other hard formulations of acetate have been developed which can do practically the same job as any other cellulosic and at the same price as standard material. He cites telephone housings and toilet seats as outstanding examples of this view.

Film Increases

Acetate film under 0.003 gage increased in volume by between 4 and 5 million pounds over 1949. This increase was due to more than heavy demand, coming largely from a new dry extrusion process that didn't really get under way until 1950. Capacity for this type film is still limited, but new facilities which will come in during early 1951 may possibly assure a volume of one million pounds a month. The new film is now the same price as cast film with the same clarity, but has a surface slightly inferior to cast film. Hence the latter will continue to hold the market in that type of packaging where it is necessary to have a more perfect surface. The extruded film is flatter and a bit easier to handle on wrapping machines and is headed for a big market in wrapping vegetables and meat. A large portion of the 1951 production will be channelled into the defense program where the film is an essential part of ordnance wrap—a moisture resistant barrier consisting of foil, film, and wax.

"Other Cellulosics" in Table C, p. 60, consist largely of ethyl cellulose and Valite, which is derived from bagasse. Production increased from 8.5 million pounds in 1949 to nearly 12 million pounds in 1950. By far the biggest use for both was in phonograph records.

Producers of ethyl cellulose state that they could have sold twice as much as they could produce but actually sold only two-thirds of their capacity because of shortages of ethyl chloride. Capacity for molding powder was reported to be about 800 thousand pounds a month at the close of World War II. The major portion of ethyl cellulose production may well be taken by the defense program for proximity fuses, inhibitor strips, strip coatings, and elec-

trical applications where its toughness and low-temperature flexibility are desirable.

Producers are a bit unhappy over this trend, since interest in ethyl cellulose for molded items had just reached its highest pitch since 1945. Scale models for advertising promotion; textile bobbins; tool handles; large size refrigerator pieces; extruded wire coating for use in blasting operations; and sporting goods items such as shot-gun shell casings, bowling pins, golf club faces, and football helmets in ethyl cellulose were all beginning to make their presence felt in the market place.

Acrylic Uses

Acrylics too were under allocation by producers before 1950 was over. Molding material was sold in the greatest quantity ever reached. Automobile medallions, lenses, etc., were by far the largest outlet, but large molded signs were beginning to show up in increasing quantities.

Molding powder production capacity for acrylics is reported to have been more than doubled after World War II, but has never been totally utilized. According to one representative of the industry, there has been a major changeover from production of the older formulations to the newer higher heat-resistant types, and this switch required equipment alterations. All this, together with the business of readying unused facilities for production, takes time. Consequently, it is possible that there may be more acrylic molding powder available in 1951 than in 1950.

Total acrylic production in 1949—both molding material and sheet—was estimated at between 22 and 25 million pounds, of which slightly less than half was molding compound. Total wartime production at peak was reported to be over 30 million pounds annually, but some of the wartime sheeting plants have been deactivated. Acrylic sheet is now running considerably ahead of 1949 because of the stepped-up aviation program and increased fabrication of large outdoor signs. Imports from Great Britain have helped to satisfy the demand.

Polyethylene Applications

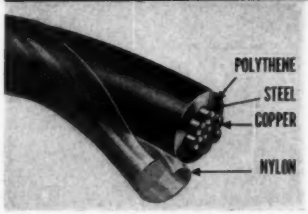
Polyethylene was first of the plastics to feel the direct impact of increased military demand. Its flexibility at low temperature, excellent electrical properties, chemical resistance, ease of fabrication, and its desirable qualities for packaging purposes put it high on the list of items wanted by Armed Service technicians. The British developed polyethylene during World War II and used most of the small amount available in radar equipment. Since that time it has become an indispensable component of many electronic parts and is undoubtedly under broad experimentation for use in secret weapons or in other applications about which government men will not talk.

Toward the end of World War II, polyethylene was found to be more satisfactory than any other material for insulating assault wire, an expendable conductor which is laid on the ground for communications purposes during battle and never picked up. Rumors were circulated in July and August that assault wire would be procured by the millions of miles. Since the wire takes 14 pounds of polyethylene per mile, the resulting poundage would be tremendous. But the wire requires a nylon jacket to resist abrasion when wrapped around trees, posts, etc., and the amount of nylon available would not even come close to taking care of the "millions of miles" of wire talked about. Consequently, there will probably be an adjustment in the amount of polyethylene desired for assault wire. But even so, it will still require several million pounds. However, millions of pounds will be required for other military applications. In addition to its use in electronic equipment, anyone can see the potentials when the military gets around to requisitioning polyethylene for such things as unbreakable bottles and carboys, packaging, and for non-corrosive coatings.

Polyethylene Production

At the beginning of 1950, it was estimated that total capacity for polyethylene production was somewhere

POLYETHYLENE-NYLON ON ASSAULT WIRE



Courtesy E. I. du Pont de Nemours & Co., Inc.

ONE of the most widely discussed military applications of plastics is the WD-1 assault wire to be used for telephonic communications in the field. Although the exact quantity of this wire which has been ordered is a restricted figure, it is reported that millions of miles are to be produced.

This figure seems unbelievable until it is recalled that the wire, like most battlefield equipment, is considered expendable. The importance of the "millions of miles" to the plastics industry becomes evident when it is noted that the WD-1 wire requires about 14 lb. of polyethylene and 9 lb. of nylon per mile.

The assault wire is so-called because it is designed to take the rough treatment which would be involved in laying the wire over rough terrain from a jeep, helicopter, or conventional plane.

The WD-1 assault wire is what is known as twisted pair or two-conductor wire. It is made up of two separate insulated wires twisted together with no additional insulation around the twisted pair. Each conductor (see photo) is made up of three strands of No. 24 copper wire which are separately tinned and then spiralled.

The spiralled conductor is passed through the cross-head of a wire coater, where it is covered with polyethylene. The thickness of the polyethylene insulation varies somewhat, but the usage averages 14 lb. of polyethylene per mile of twisted pair.

The polyethylene-covered conductor is then passed through the cross-head of an extruder and coated with nylon. The specifications for the wire call for a minimum thickness of 0.004 in. for this nylon jacket. In actual practice, the thickness varies from 0.004 to 0.008 in. The variation results from the differences in the thickness of the polyethylene insulation.

In the last few months of 1950, 300,000 lb. of nylon per month were being used to produce the assault wire. Production was expected to be increased considerably in 1951.

Table D—Consumption in Pounds of Polyvinyl Chloride and Copolymers Only, 1949-1950

	1949		1950	
	Resin only	*Total poundage with filler*	*Resin only*	*Total poundage with filler*
Film (under 10 mils)	54,000,000	84,000,000	80,000,000	130,000,000
Sheeting (over 10 mils)	30,000,000	54,000,000	62,000,000	118,000,000
Fabric coating	25,000,000	53,000,000	34,000,000	75,000,000
Paper treatment	5,000,000	7,500,000	7,500,000	11,500,000
Molding and extrusion	38,000,000	68,000,000	68,000,000	130,000,000
All other including protective and surface coating	29,000,000	40,000,000	35,000,000	48,000,000
TOTALS	181,000,000	306,500,000	286,500,000	512,500,000

between 50 and 60 million pounds annually. In this magazine, a year ago, it was suggested that that amount would probably be enough to supply demand for the time being because there were not enough facilities to absorb the industry's capacity to produce. But the facilities came in fast. Extrusion equipment was built especially to handle polyethylene; molders soon caught on to the great potentialities in polyethylene-molded products.

By April 1950, processors were clamoring for more polyethylene. A great portion of it was used for film and sheeting. Thin gage was used for packaging, refrigerator bags, and in various types of consumer goods. Four- to 6-mil material gained high popularity as a liner for metal or fiber containers for shipping hygroscopic materials such as chemicals, sugar, etc. Paper coated with polyethylene became a much wanted material for the inner layer of multiwall bags and as a wrapper for various food items. An unbreakable bottle manufacturer is reported to have said he expected to reach a goal of 100 million bottles a year. Extruded pipe that won't corrode began to find a market. Polyethylene dishware manufacturers sprang up in various parts of the country. Then came Korea and a frank warning by polyethylene producers that civilian uses would soon have to be curtailed because of an anticipated heavy demand by the Armed Forces.

More polyethylene is on the way, but the best guesser on earth doesn't know whether or not it will be enough. Du Pont will reportedly have about one third more by June 1951 than it had in June 1950. It has been expanding capacity by degrees through alteration of production processes. It is believed that by July 1952 it will also have installed substantial new facilities. Bakelite, the other producer, has announced that a new plant will come in by midsummer, 1951. These expansion plans mean that by the middle of the year, total production may be somewhere between 90 and 100 million pounds. The toughest time in polyethylene procurement is expected to be the second quarter of 1951.

Phenolic Production

The phenolic branch of the plastics industry produced over 370 million pounds of material in 1950 compared to a little over 240 million pounds in 1949. A good portion of this increase was in molding material where there was a growth of from 131 million pounds in 1949 to well over 210 million in 1950. The situation in the last four months was so uncertain that any estimate may be several million pounds off. In August, production reached the amazing total of over 22 million pounds—greatest in history—yet in July 1949 production had descended to a post-war record low of a little over 4 million pounds.

Most producers were predicting that the last four months of 1950 would show a decline due to shortages of phenol, yet far more phenol was produced in this country in 1950 than in any other year. And despite this huge production rate, producers were practically hiding from customers who wanted more material.

The situation in phenolic molding material is providing gray hairs for producers—who are not at all unanimous on what will happen in the near future. Today great quantities of it are going into television and radio cabinets, electrical appliances, automobiles, and electrical fixtures. With a threatened decline in production of all of these, as well as in housing construction, it is possible that phenolic will be readily available by the second quarter of 1951.

Products for defense will no doubt take up some of the slack, but they are mighty slow in coming to light. In November, only 5% of phenolic molding material was ticketed for direct military applications. Producers remember that 1941 was a record year up to that time, but that 1942 was slow due to the changeover from a civilian to a military economy. They are hopeful that government actions won't result in cutting back civilian production faster than defense production can take up the slack.

Another puzzle is: "How much phenolic will the defense program require?" In World War II, phenolic molding powder production was from 6 to 10 million pounds a month and most of it was taken for military or essential goods. Today's production of nearly 20 million pounds a month is a quite different figure. Capacity is rated at well over 30 million pounds, but phenol today, in contrast to formaldehyde in the early 1940's, is a limiting factor. Formaldehyde production in war years was only 420 million pounds a year, but today's capacity is estimated at close to one billion pounds.

Laminating Resins

Phenolic laminating-resins production jumped from 40 million pounds in 1949 to near 70 million pounds in

(*Continued on p. 140*)

APPLICATION TRENDS IN 1950

DESPITE a constantly changing supply picture as far as plastics materials were concerned, 1950 was a year of constant progress for plastics applications. Plastics made important and significant inroads into many new fields and made substantial gains in most of the fields in which they already had a foothold.

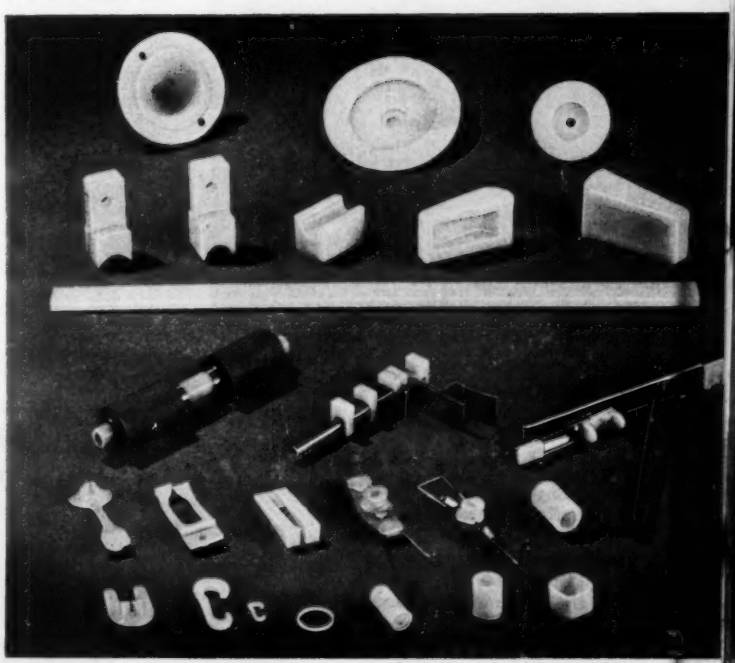
Toward the end of the year, military and essential industrial applications began to gobble up increasing shares of available materials, and a number of the trends in civilian applications which had been gathering momentum early in the year were slowed down. Whether those trends will be stopped or will be able to continue in 1951, they remain significant indications of the course along which the plastics industry has been heading—and along which it will head once more when we are again doing business as usual.

Industrial

One of the most significant industrial application developments of 1950 was the introduction of a process for using phenolic resins in the production of sand foundry molds and cores. The process, described in MODERN PLASTICS in July, offers so many advantages over previous methods that it is expected to be widely adopted. Some experts estimate that this single application will consume more phenolic resin than any other single use of the material.

For large industrial parts, there was an increased number of applications of polyester-glass fiber constructions. Matched metal molds, contact pressure, and other methods of production were all used to produce tote boxes, trays, and an increasing number of large housings. Polyester-glass fiber housings were made during 1950 for outboard motors, lawn mowers, power scythes, aerial cameras, and machines of various types.

Another industrial application which seems to have a great potential is the use of cast phenolic mod-

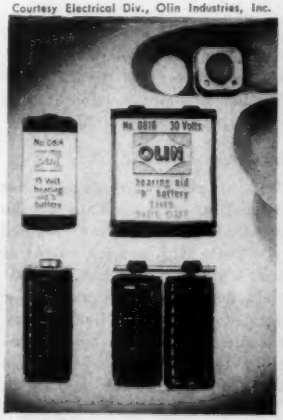


Courtesy E. I. du Pont de Nemours & Co., Inc.

Thread guides, parallel blocks, bearings, and other molded nylon parts are all used in textile machinery. Other molded nylon parts found many other industrial applications

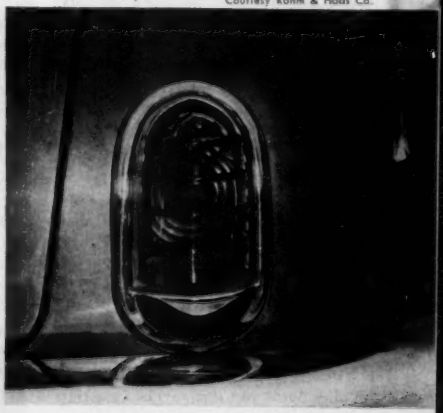
Hearing aid batteries made of interlocking rectangular butyrate sections

Courtesy Electrical Div., Olin Industries, Inc.



Acrylic has taken over from glass as a material for tail-light lenses; the 1951 Lincoln is shown

Courtesy Rohm & Haas Co.



Courtesy The Hoover Co.

Latest model Hoover vacuum cleaner has flame resistant acetate motor housing and elastomeric vinyl bumpers. Hose is made of two vinyl extrusions reinforced with wire, is lighter, more flexible than old type hose

els instead of built-up wooden patterns during the process of tooling-up for automobile production. This method cut the time and expense in tooling-up for the new Henry J, and Kaiser-Frazer's example is expected to be followed by other auto makers and by manufacturers in other fields.

The year 1950 also saw a tremendous increase in the use of potted circuits—electrical circuits embedded in a plastic casting, usually polyester. Potted circuits were used in applications ranging from involved high frequency electronic circuits for military purposes to tiny amplifiers in hearing aids.

Molded nylon parts continued to find more and more applications in textile machinery for bobbins, bearings, thread guides, flyer blocks, etc., as reported in these pages in April.

Toward the end of 1950, one of the most widely discussed military applications of plastics was the polyethylene-insulated, nylon-jacketed assault wire (see p. 63). This was only one of the increasingly varied uses of plastics for wire coating. Also of major importance was the use of plastics in coaxial cable for television networks.

Among other important industrial applications of 1950 were plastics pipes, particularly in the oil fields (see March issue); plastics in batteries (see June issue); and carboys and other containers fabricated of heavy-gage polyethylene sheet.

Photos courtesy Apex Electrical Mfg. Co.

Use of polyester resins and glass fibers in major appliances is shown by durable, light weight tub and lid for automatic dishwasher

Automotive

Uses of plastics in automobiles continued to expand. One of the low-priced cars contained molded acrylic parts with a total weight of almost 4 pounds. In almost all 1951 models, acrylic was being used for parking-light and tail-light lenses. The same material showed up frequently in instrument dials, horn buttons, and decorative medallions.

The 1951 Studebaker, introduced late in 1950, had one application which may well be an indication of many more to come: a substitution of acrylic for chrome. The spinner hub in the center of the front of the car was a chrome-plated die casting in the 1950 model. In the '51, it is molded of clear Plexiglas, paint sprayed on the back.

In addition to the various uses of acrylic—and the phenolic applications (such as distributor caps) which have long been standard—almost every automobile manufacturer was experimenting with plastics for spring liners, the cushioning material between the rear spring leaves. At the end of the year, one of the new models came out with enclosed-type springs containing liners made of 20-mil polyethylene sheet. This material is said to be

quieter, more economical, and longer lasting than the materials previously used. Shortages of polyethylene seemed to be the only bar to adoption of the application by others.

The other uses of plastics in automobiles included vinyl sheeting for original upholstery in trucks, station wagons, and taxis; vinyl-coated glass cloth for convertible tops; and vinyl fender welting and gaskets.

Housewares

The progress of plastics in housewares was more a matter of increased volume and increased acceptance than of new applications. The quality of plastics housewares generally improved as high heat-resistant styrene and other improved materials came into general use.

Melamine tableware, which had already secured a firm foothold in the commercial and institutional tableware market, began to move into the home. Its drive for consumer acceptance was greatly furthered by the introduction of such "decorator" colors as burgundy and chartreuse.

The same tendency toward the use of fashion colors was noticeable in all houseware items. An example of this is the "High-Style Butyrate Bowls" shown in the February issue of MODERN PLASTICS.

Among the individual applications which grew considerably in volume during the year were dish drainers and racks made of metal and coated with vinyl plastisol; juice shakers of all types for mixing and storing frozen fruit juices; and table place mats, particularly those made of vinyl and embossed to resemble hemp, lace, etc.

In hardware, plastic continued to replace wood for tool handles. Tennessee Eastman announced in October that 46 manufacturers of small tools were using Tenite for handles of screwdrivers and chisels. The same material was being used increasingly for handles on saws, planes, pliers, bit braces, etc.

Courtesy Rohm & Haas Co.

Acrylic has advanced rapidly in glazing applications. Wide expanse of windows in Sky Cabana atop Senator Hotel, Atlantic City, N. J. is glazed with shatterproof acrylic

Toys, Sports Goods

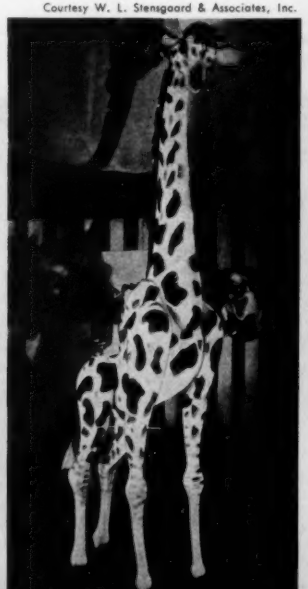
In toys, the most startling development was the tremendous rise of slush-molded vinyl in the production of doll parts, puppets, and many other toys. The comparatively new and relatively simple slush-molding

Service station emblems, fabricated of acrylic, are growing still larger. This Shell sign is 8 ft. wide

Courtesy Steiner Plastics Mfg. Co., Inc.

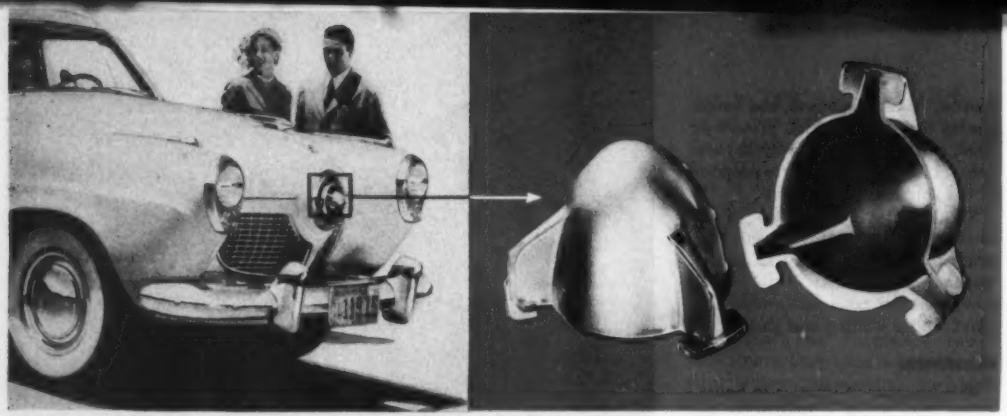
Newest displays include giant giraffe 11 ft. high of foamed polystyrene

Courtesy W. L. Stensgaard & Associates, Inc.



Woven saran material on outdoor chaise lounge resists weather, is easy to clean

Courtesy Lumite Div., Chicopee Mfg. Corp.



Photos courtesy Rohm & Haas Co.

Molded acrylic spinner hub on front of 1951 Studebaker replaces chromium-plated cast metal part used in the 1950 Studebaker

Studebaker spinner hub is molded of clear acrylic and spray painted on the inside. Part is 3⅞ in. in diameter and 3½ in. deep, weighs 4½ ounces

process (see MODERN PLASTICS, October issue) made possible many items which could not previously be produced economically.

Fabricators of vinyl inflatables continued to produce more and more pieces and larger and larger items. Bilnor Corp. introduced a 9-ft. diameter backyard swimming pool and a 6-ft. diameter water wheel. Roly-poly-type punching bags 3 and 4 ft. high were being made by a number of manufacturers.

In the game field, the Canasta craze created a market for molded plastic trays and shuffling devices and for table covers with pockets or slots for melded cards.

In sporting goods, the meteoric rise of polyester-Fiberglas fishing rods was the most significant advance. At the Hardware Show in October, 36 manufacturers were showing Fiberglas rods, and industry experts estimated that at least another 36 were in the business. By the end of 1950, almost four million polyester-glass fiber rods were in use and about one million of these were produced in 1950. It was estimated that, by the end of 1950, half a million fishing rods were being produced per month and that half of these were polyester-Fiberglas rods.

Television, Records

The television industry continued to consume large quantities of phenolic for cabinets; styrene for masks, escutcheons, etc.; and polyethylene for insulation inside the set. Admiral Corp., which pioneered the use of phenolic cabinets in television, broke its own record for size by bringing out a 41-lb. consolette cabinet (April issue).

Indirectly, television also made possible another large volume application of plastics. One might say that television begat Godfrey and Godfrey begat the ukulele craze which in turn begat molded styrene ukes. By the end of the year, there was not only a rash of such ukes, both full-scale and toy size, but there were plastic devices to clamp on the ukes so that a chord could be played simply by pushing a button.

In the musical field proper, plastics continued to take over the phonograph record field. Vinyl was an important component of all the new long-playing records. Both vinyl and styrene were being used to mold children's records.

Appliances

In electrical appliances in general —and in refrigerators in particular

Fabricators of vinyl inflatables increased the size of their items as well as the size of their market. This vinyl water wheel, 6 ft. in diameter, is made by Bilnor Corp.

Courtesy Bakelite Div.

Large phenolic cabinets, like 42-lb. Admiral television case, may soon be used for air conditioners

Molded melamine tableware was widely adopted for institutional use and, with the introduction of highly styled sets like the Brookpark set above, began to move into the home

Courtesy Tennessee Eastman Corp.

Butyrate handles, standard on screw drivers, showed up often on other tools

—the tendency to use more and more plastics was strengthened by the industry's ability to produce larger pieces (see "Thermoplastic Big Shots," July). Early in 1950, the Crosley Shelvador had more plastics than any other refrigerator: 24 lb. per unit. By the end of the year, the average for the industry was approaching that amount, and the installation of larger injection molding machines indicated that there would be new applications to swell the figure.

Flame-resistant cellulose acetate, blessed with Underwriters' Laboratories approval in many specific applications, became increasingly popular for small appliance housings. Larger appliances, such as fans and humidifiers, appeared in phenolic, styrene, and other plastic housings. Air conditioning units seemed destined to follow the lead of T.V. sets and go into molded phenolic housings. Vacuum cleaners, some of which used acetate housings, also used more and more vinyl for bumpers. One model, introduced by Hoover, also had a vinyl hose in place of the usual wire coil covered with fabric.

Washing machine manufacturers, in addition to using phenolic agitators, began to turn to polyester-glass fiber tubs and lids (see April issue). At the end of the year, at least one major manufacturer was known to be tooling up for a larger polyester-Fiberglas housing.

Signs, Displays

1950 was a banner year for large acrylic signs. It marked the successful culmination of a three-year combined effort on the part of Rohm & Haas Co., plastic fabricators, and sign manufacturers to obtain official recognition and approval of acrylic as a sign material. Acrylic signs (sometimes referred to in the regulations as "Plexiglas signs") were approved in the Basic Building Code of the Building Officials Conference of America and by the cities of New York and San Francisco. Thus acrylic is now considered acceptable for outdoor signs in most major cities.

While securing legal recognition, acrylic signs were greatly expanding their markets. Gasoline stations continued to be the number one outlet. Another application, the signs for Ford dealers, was reported in these pages in August. While the market increased, the size of individual signs was also growing larger. By the end of the year, Steiner Plastics Mfg. Co., Inc., was in production on an 8-ft. wide emblem and 4-ft. high letters for Shell.

In the display field, the big news was Styrofoam, which was used for everything from small bar-top or counter displays to an 11-ft. high giraffe (see October issue).

Architecture, Decoration

In architecture, plastics continued as a minor factor, but there were a number of individual applications which showed great promise for the future. Because of its resistance to breakage, acrylic was becoming more and more popular for glazing in industrial buildings, schools, or other places where frequent replacement is usually necessary.

Reports that flying glass will be

Courtesy Firestone Plastics Co.

Chair is upholstered in vinyl sheet decorated by new embossing method

one of the major hazards in case of an atomic attack indicated that civilian defense experts may recommend acrylic as a glazing material for cellars and other areas which might be used as improvised bomb shelters.

Corrugated polyester-Fiberglas sheet materials were used more and more often in skylights and sidelights of corrugated buildings. In addition to this use (for which they were originally developed), the materials received some attention from consumer home magazines and from architects for porch and patio roofs. On the West Coast, a large modern school was built with the entire roof made of translucent polyester-Fiberglas corrugated sheets. The roof lets in so much light that the need for artificial lighting during the day is virtually eliminated.

In interior decoration, the vinyls made great strides and secured increased consumer acceptance, mainly because of the introduction of embossed and printed materials with fabric-like appearance (see September issue). Manufacturers of paper drapes, whose field was invaded by vinyl early in the year, were virtually out of business by the end of 1950. In shower curtains, the rule of vinyl was practically unquestioned: 90% of the shower curtains being made are now vinyl.

Furniture

In furnitures, plastic decorative laminates were being used for most of the dinette sets made, and in many lines the chairs that went with them were upholstered in matching vinyl. But the real furniture news of the year was the march of the laminates into the living room, dining room, and even the bedroom.

Cocktail tables, which get the roughest wear, were the natural entering wedge for cigarette-proof, alcohol-proof, wood-grained laminates. By the end of 1950, virtually any type of furniture which was being made with wood veneer was also being made with decorative laminates. This included occasional tables of all types, dining room suites, and bedroom suites (see "What's New in Decorative Laminates," Oct. issue).

Although molded polyester-Fiberglas is yet to become a major factor in the furniture field, the material received an important forward push when a molded chair won a prize in the Museum of Modern Art Low Cost Furniture Competition (see August issue).

In outdoor furniture, the best sellers of 1950 were weather-proof, lightweight chairs and chaise lounges with aluminum frames and woven saran monofilament webbing seats. At the end of the year, woven saran made its first appearance in a modern folding chair with a birch frame. The plastic material also found increased use during the year for upholstery in public places such as theaters, hotel lobbies, etc.

Packaging

In the packaging field, the economies of plastic molding encouraged and in turn benefited by a fashion for reusable packages. All types of cheese appeared in molded styrene boxes reusable as refrigerator dishes. Candy and other foods were sold in molded boxes. Towards the end of the year, Swing-A-Way wall-type can openers and ice crushers appeared in two-color molded styrene gift boxes.

Despite a limited supply of polyethylene, squeezable bottles expanded their markets. The technique of decorating such bottles improved, and a number of private mold bottles made their appearance.

Polyethylene film was fabricated into drum liners (see April issue) to solve packaging problems for many chemical manufacturers and for some branches of the armed forces. The same material, laminated to paper, was used to make multiwall bags for packaging plastic molding powders, chemicals, and some hard-to-package food products (December issue).

The various applications mentioned above are by no means all of the new, important, or significant uses of plastics in 1950. There were many other innovations and many other standard applications which increased tremendously in volume during the year. But enough cases have been cited to show that plastics applications are striding forward in seven-league boots and to indicate the routes along which they are striding. The routes may be changed materially for the time being by mobilization demands on materials; but the ground-work has been laid for an expansion of plastics usage far beyond the fondest dreams of Hyatt and Baekeland.

Decorative plastic laminate, incorporating a veneer of actual wood 1/85-in. thick, forms the damage-proof wearing surfaces on both top and sides of this hotel room desk

Courtesy The Herman Miller Furniture Co.

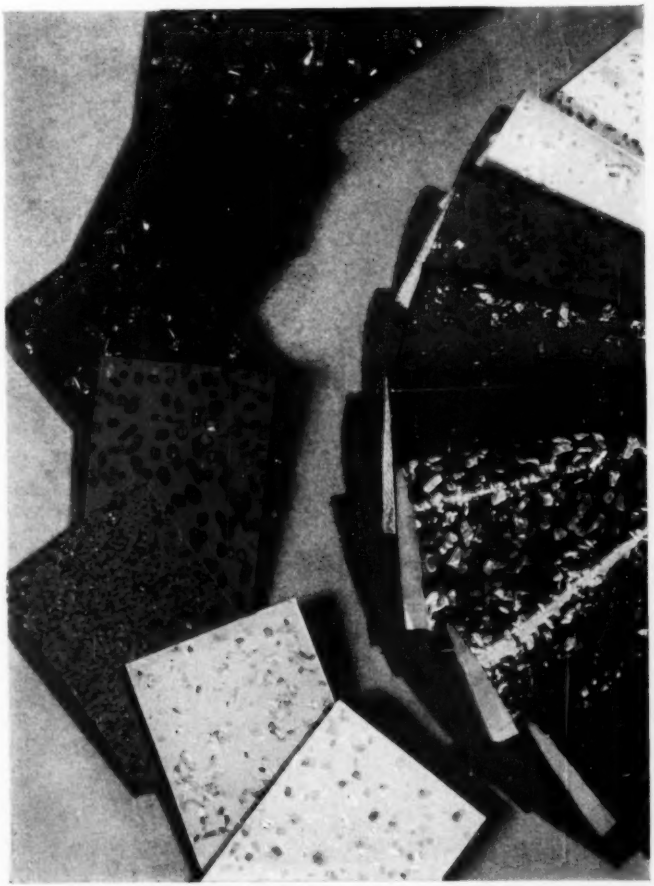
Iridescence Built into Plastics

A virtually unlimited field of decorative applications is opened to many plastics materials by incorporating flake-like particles of natural shells

IRIDESCENCE unlike that found in any other plastic materials is built into a new family of decorative materials known as Irilite. The effect is obtained by putting iridescent particles on a colored background and covering them with a transparent protective coating. The flake-like particles are made from natural shell materials mechanically and chemically treated to produce a variety of iridescent colors and effects.

The Irilite flakes and the decorative materials made with them are a product of Jos. H. Meyer Bros., Brooklyn, N.Y., the manufacturer of Richelieu pearls. Among the Irilite materials currently being produced by Meyer Bros. are: 1) rigid polyester material for table tops, wallboard, or decorative panels; 2) flexible vinyl-coated fabric and vinyl-coated decorative paper; 3) acrylic sheets, rods, and tubes coated with the iridescent particles; 5) cast polyester buttons, ornaments, jewelry, and special shapes.

In each type of material, the decorative effect can be varied by varying the color of the background, the color of the particles, the size of the particles, and the number of particles per square inch.



Chips of polyester panel board (left) and swatches of vinyl-coated fabric show some of colors, particle sizes, and iridescent effects obtainable with Irilite flake material

Methods of Manufacture

The methods used to manufacture the various Irilite materials were specially developed because the iridescent particles are easily crushed and lose their beauty when subjected to most heat and pressure techniques. As a result, they must be handled gently until they are in their final state and are completely protected by polymerized plastic.

The wall board and table top material is made in 4 by 8 ft. panels by a four-stage process. Colored resin binders are first applied to Masonite, and the Irilite flakes are spread on the resin binder with a special apparatus developed to insure even distribution. The transparent resin cover surface is then applied and cured. The resins used are blends of polyesters and alkyds.

Although Masonite is usually used for the backing sheet in Irilite panel boards, other hard boards, plywood, Transite, and many other materials can also be used, depending upon the application. If an Irilite veneer is desired, it can be produced by using a backing sheet which can be stripped off after the veneer is cured.

Vinyl-coated fabrics and papers and Irilite vinyl film are produced

Rods and tubes made of acrylic are coated with iridescent flakes and pigment

on film-laminating equipment and coaters adapted for high speed, electrically heated multiple coating. Vibrating shakers are used to disperse the Irilite particles evenly while the coating is being applied. This work is done on special equipment built for Meyer by Van Vlaanderen Machine Co., Paterson, N.J.

The Irilite coatings on acrylic sheets, rods, and tubes (and even on glass) have been made possible by the development of special resin adhesives which form a permanent bond between the particles and the acrylic or glass, and at the same time form a protective coating for the particles.

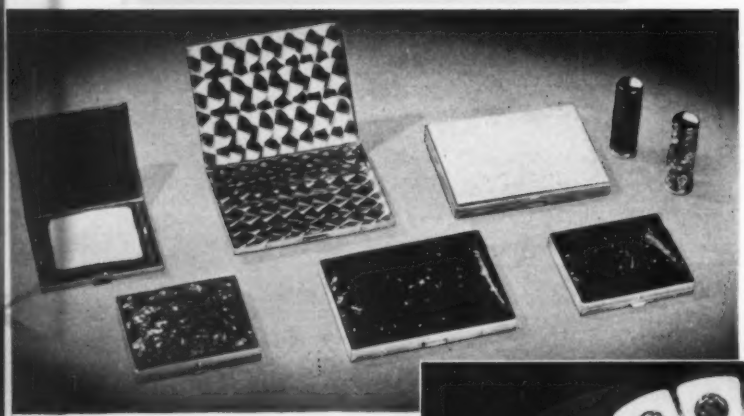
In the cast products (such as the tops for the compacts and cigarette cases shown), strong castings can be made with heavy concentrations of Irilite flakes. The particles are settled by agitation to insure a concentration of resin on the surface and thus permit the casting to be polished and/or tumbled without damaging the Irilite particles.

Varied Applications

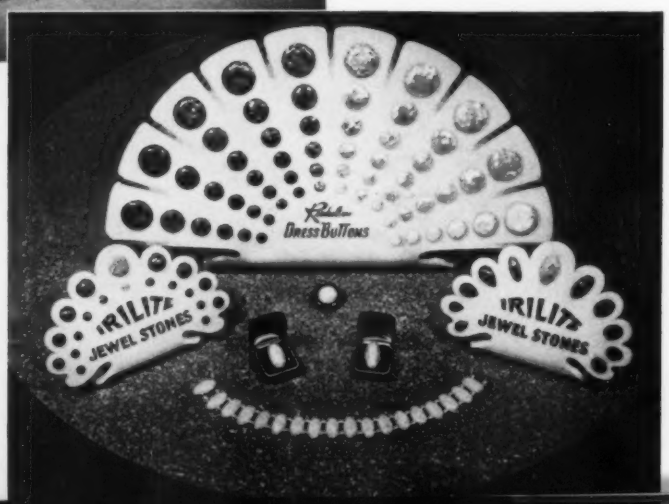
The unusual beauty of Irilite materials and the fact that they are available in such a wide variety of forms, colors, and flake patterns make them suitable for almost unlimited decorative applications.

Rigid Irilite panel boards make beautiful and durable dinette table tops. In this application, one of the advantages of the material is the availability of upholstery material which matches the table top exactly in color and in the size and number per sq. in. of iridescent particles.

The Masonite-backed panel board



Compacts and cigarette cases have cast polyester Irilite tops in metal frames



Dress buttons and stones for jewelry can be cast of new iridescent material

can also be used as an alcohol-resistant top for coffee tables, cocktail tables, and other occasional tables. One manufacturer of bars for hotels and home recreation rooms is using Irilite polyester panel board for the sides plus tops of some bars.

The panel board can also be applied directly to studding to make a beautiful finished wall surface which requires no plaster, wall paper, or paint and will retain its beauty and gloss indefinitely.

Many applications have been made in restaurants, bars, hotels, and department stores. Installations have been made in the powder rooms of Leone's Restaurant in New York, in the Chick-n-Coop Restaurant, Montreal, Canada, and in the dining room of Corde's Restaurant, New York, N.Y.

Sheets or tiles made of Irilite flakes and vinyl resin on a glass backing are used for exterior applications such as store fronts. The Irilite show room on Fifth Avenue, New York, N.Y., has a striking store front made of this material. Small pieces cut to shape can be used to form the name of the store or to build up a vari-colored mosaic.

Irilite panel boards have also been used for lamp bases, mirror frames, and for backgrounds for displays in store windows and in booths at expositions and trade shows.

Irilite-coated fabrics are used mainly for upholstery, in the same manner as any other supported vinyl sheeting. Like Irilite panel board, the material's unusual appearance and consequent value as an eye-catcher has made it popular for store window displays and other display uses. Irilite belts are being made by three manufacturers. Shoes and luggage are other applications soon to begin production.

Rods and tubes of Irilite are being used as uprights for lamps, for door and drawer pulls, for display stands, and for handles of all types.

Meyer Bros. itself is making use of cast Irilite in a line of decorative buttons. Other applications of Irilite cast-to-shape include the tops of compacts made by The Marhill Co., Inc., New York. Early in 1951, the jewelry field will hear more about Irilite. In its spring jewelry line, Meyer Bros. will include necklaces and bracelets made with Irilite beads.

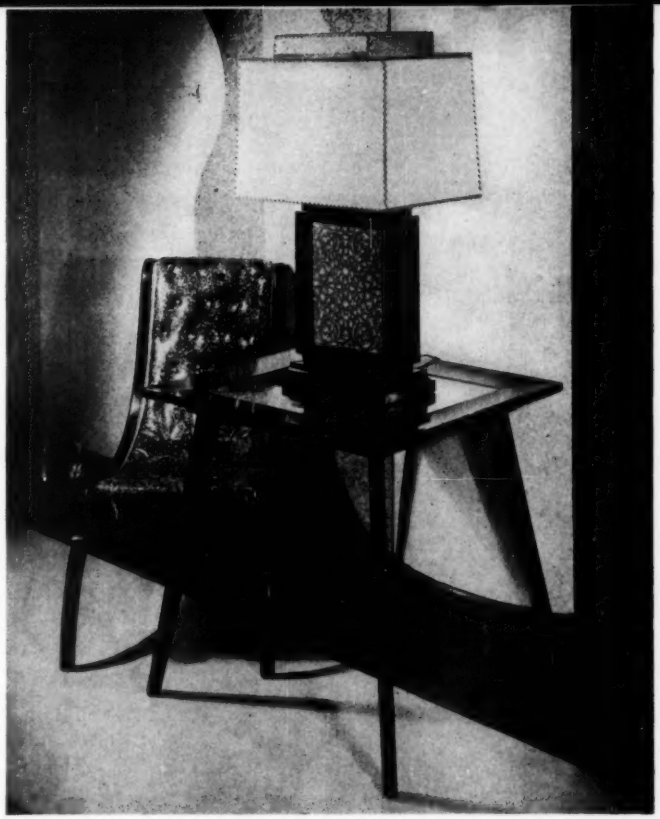
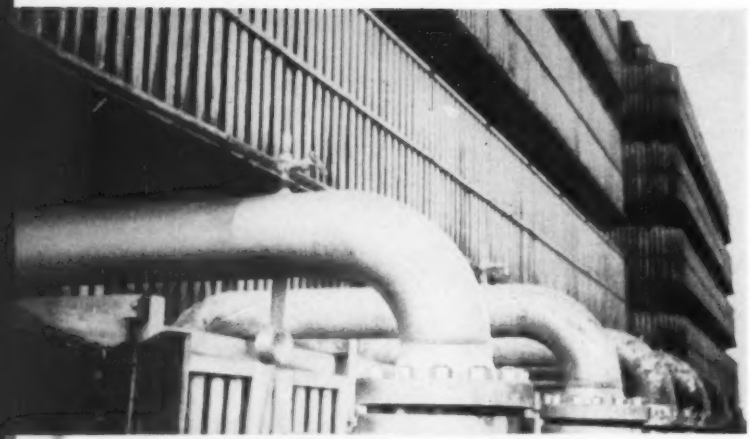


Table top and lamp base are decorated with Masonite-backed Irilite panel board. Chair is upholstered in vinyl-coated fabric. Wall is surfaced with vinyl and glass Irilite

Dinette set has table top made of Irilite panel board. Chairs are upholstered in vinyl-coated fabric which matches the table top in color and size of iridescent particles used

Test Report on



All illustrations courtesy Bauer & Black

Large pipes in a cooling tower are protected with the new polyethylene tape

THE increase in production of polyethylene resins in the United States to an estimated 55 million lb. in 1950 has been due largely to the impetus of critical needs for a superior insulating material in the electronic and electrical industries.

Polyethylene's properties of low moisture take-up, low water-vapor transmission, low dielectric constant, low power factor, high dielectric strength, high insulation resistance, high corona-quenching performance, high electrolytic-corrosion resistance, excellent low temperature flexibility, excellent resistance to aging, good chemical resistance, and resistance to bacteria have made it a most important factor in these industries (as in coaxial cable) and have carried it into squeeze bottles, chemical containers, packaging films, and other strictly utilitarian applications.

Numerous articles have described the preparation, mechanical properties, molding and extrusion characteristics, fine structure, and electromagnetic response of polyethylene.[1]

Tapes and films of polyethylene are not new, as the literature shows. But adhesive-backed polyethylene tapes are new and important in electrical and electronic work. These pressure-sensitive tapes, cut from calendered film, offer features not available in any previously known tape product. This article reports on the characteristics and uses of such products[2] made with oriented polyethylene film or sheet.

These new tapes were not easy to evolve. Two broad efforts were entailed: 1) development of high-strength oriented polyethylene films. 2) development of suitable adhesive mass formulations and methods of application to overcome the physical and chemical inertness of polyethylene and thus accomplish anchorage of the adhesive to the tape.

The objectives have been accomplished. There are today available high-strength oriented polyethylene films in an assortment of colors, ranging in thickness from 4 to 10 mils, in widths from ½ to 30 in., and with tensile strengths up to 3 lb. per mil per in. of width at less than 100% elongation-at-break. These same materials are available in the form of pressure-sensitive adhesive films or tapes, on 5- or 7-mil stock in widths of ½ to 22 inches.

Preservation of the unusual properties of the resin in these high-strength pressure-sensitive films has extended and simplified the mechanics of polyethylene application. The introduction of an adhesive-backed polyethylene tape as the sole insulator for splicing conductors is a major step from the time-honored use of materials such as saturated or metallized paper, asphalted or paraffined textile fabrics, rubber splicing compounds, rubber tape, and friction tape.

In the packaging field the elastic, conformable polyethylene tapes are used as specialized packaging sealants, where a positive seal over odd-shaped closures is important, and where in-or-out moisture must be controlled.

A present application development of polyethylene tapes in the corrosion-protection of metallic surfaces has great significance and promise of extension into new fields. Because of the high strength and elasticity of the oriented film as contrasted with melt-extruded film, polyethylene adhesive films and tapes applied over cylindrical or other curved metal surfaces maintain a positive pressure which insures an adequate bond between the tape and the metal surface. Coupled with the characteristic low water take-up and water-vapor transmission rate through the film, this results in an ideal anti-corrosion protection. The mechanical ease of application of such a tape when compared with other methods using a hot-melt, spray, or brush coating has greatly stimulated polyethylene tape use in the field for durably coating—both above and below ground—pipe and fittings in transmission and distribution lines. These uses are extending to pipe protection in refrigeration, air conditioning, and chemical processing.

An examination of the properties of a typical tape[3] in current production, composed of 7-mil oriented polyethylene film with a 2-mil adhesive mass will account for the success of long-term field tests.

1) *Load Cycle Tests*—A basic proof test for insulating materials was used.

[1] G. M. Kline, MODERN PLASTICS, *23*, 141 (May 1946). C. S. Myers, MODERN PLASTICS, *21*, 103 (Aug. 1944). A. E. Maibauer and C. S. Myers, Trans. of the Electrochemical Society, *90*, 449 (1946). W. M. D. Bryant, Journal of Polymer Science, *2*, 547 (1947). F. C. Hohn, M. C. Macht and David A. Fletcher, Ind. Eng. Chem., *37*, 526 (1945). R. G. Newberg, D. W. Young and H. C. Evans, MODERN PLASTICS, *26*, 119 (Dec. 1948).

[2] References are to typical current Polyken 800 Series, polyethylene-backed pressure-sensitive films and tapes, products of the Polyken Dept., Bauer & Black, Chicago, Ill.

[3] Polyken Tape #822

REVOLUTIONARY TAPES

Adhesive-backed, pressure-sensitive oriented polyethylene tapes and films have features not available in any previous product. Their future is both fabulous and assured by **WILLIAM J. MILLER***

This consisted of a high-voltage load cycle test in which the conductor temperature was maintained at 85° C. (185° F.) for 8 out of each 24 hours. The test voltage was 33,000 volts to ground, applied continuously.

This voltage was approximately three times the rated voltage of the cable and accessories under test and was employed to accelerate aging. The polyethylene tape splices for terminals and other applications under test have never failed, although they have been energized continuously for well over a year. All types of cable (insulated with paper, rubber, and plastic) have been under test with polyethylene tape.

2) *High Voltage Breakdown Tests* —In high voltage breakdown tests, and in impulse tests, properly made polyethylene tape splices have, without exception, shown greater dielectric strength than the cable, including tests made on polyethylene insulated cable. These results include a large number of 60-cycle breakdown tests up to 300,000 volts and impulse tests up to one million volts.

3) *Insulation Resistance*— $> 10^6$ megohms (A.S.T.M. D-257-46 modified)

4) *Dielectric Strength*— > 10,000 volts (A.S.T.M. D-149-44 @ 500 v./sec.)

5) *Dielectric Constant*—(A.S.T.M. D-150-47-T 27.5° C., @ 44% R. H.) 2.6

6) Power Factor—(A.S.T.M. D-150-47-T @ 27.5° C. @ 44% R.H.) 0.0050

7) *Electrolytic-Corrosion Current* — $< 10^{-13}$ mhos. (A.S.T.M. D-1000-48T)

With the development of special production techniques, it has been possible to produce an oriented film that has improved tensile strength over unoriented film and does not cold draw appreciably. This was an important step in the production of a satisfactory adhesive tape. A tensile strength of 3000 p.s.i. (approximately 3 lb./mil/in. of width) has been found as an average for the tape. Concurrent with this property, an elongation at break of less than 100% and an initial modulus of 10,000 p.s.i. have been determined.

These characteristics are most desirable where such tape is used in the field by persons long experienced in handling materials of similar good tensile strengths. Because of the orientation, there is great resistance to tear.

Polyethylene tape has the lowest water-vapor transmission rate of any flexible tape suitable for use in electric cables or equipment. Tests have been run comparing polyethylene with another plastic tape and the results are summarized as follows:

Tape	Water Vapor Transmission Rate (A.S.T.M.-D988-48-T @ 37.78° C. (100° F.))
Polyethylene	0.24 gm./24 hr./100 in.^{2}
Polyvinyl copolymer	3.0 gm./24 hr./100 in.^{2}

Comparison of the water uptake by polyethylene and polyvinyl copolymer tapes has also been made, and it has been found that following a 10-min. immersion in boiling water the polyethylene absorbs only one-tenth as much water as the vinyl tape. Both of these results are of importance when splices are likely to be immersed or in moist surroundings.

Since the polyethylene used in this tape contains no plasticizers that are affected or leached by prolonged exposure to water or common polar solvents, the tape assembly is highly stable in the presence of such systems. Oils and non-polar solvents can cause difficulty, not through their effect on the tape, but through their swelling action on the adhesive mass during immersion. This is minimized when large areas are covered with a single adhesive film with a minimum of edge contacts for penetration.

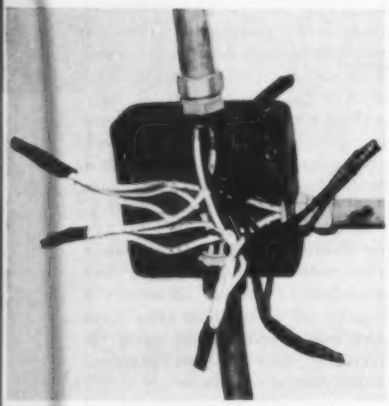
As with any new product, the aging question is difficult to answer with positive and indisputable experimental evidence. However, a number of accelerated tests have been made, and natural aging for over four years has been conducted under various conditions.

The natural aging samples both on

* Merchandising Manager, Polyken Industrial Tape Dept., Bauer & Black, Chicago, Ill.

Applying polyethylene tape in the field as a joint wrap on mill-coated pipe

Tape used to insulate battery leads is not affected by corrosive acid fumes



Splices insulated with polyethylene tape

the shelf and in service gave no evidence of aging in the polyethylene, and the adhesive remained tacky and strongly bonded.

In the load cycle tests under 33,000-volt stress, polyethylene tape splices have never failed under test with samples being continuously energized for one year. Many of these continuing tests are on terminals on test apparatus exposed to the elements and to temperature variations from —17.78° C. (0° F.) to 46.11° C. (115° F.) and humidity conditions encountered on the seaboard.

Under rather drastic Weatherometer tests for several months polyethylene splices have remained essentially unaffected in appearance, while the rubber-based tapes have cracked and split in the outer layers. Samples of polyethylene tape wrapped on house wire were placed in an oven maintained at 87° C. (188.6° F.) for 60 days as an accelerated heat aging test. At the end of this time there was no evidence of cracking or adhesion loss.

Storage stability tests have been run in which the polyethylene tape was maintained at 40.56° C. (105° F.) for 90 days and then checked for usability. No evidence of deterioration was found.

Polyethylene tape can be employed at temperatures as low as –40.0° C. (–40.0° F.) providing care is exercised in application. It is completely usable at low temperatures, and splices have been made in the open during winter weather. The polyethylene is completely flexible to –60.0° C.

Thermal Deformation

The thermal deformation of polyethylene tape has been compared with a number of other available types. Tests were performed on fresh samples of each tape and on tapes which had been subjected to accelerated oxidative aging.

These tests showed that oxidative aging has extremely deleterious effects on all of the rubber-based tapes, while polyethylene tape is essentially unaffected. At temperatures less than 105° C., the deformation characteristics of polyethylene tape were superior to those of all other tapes tested except the vinyl copolymer tape. In this case the polyethylene tape performance essentially equaled that of vinyl copolymer at ordinary temperatures and showed much greater thermal stability in the important temperature region of 75° C. to 105° C.

Soil Bacteria

Samples have aged underground for several years without supporting bacterial growth or undergoing deterioration. Laboratory tests showed the tape to have excellent resistance to Aspergillus niger, Chaetomium globosum, and Penicillium sp., in accordance with A.S.T.M. specifications D-684-45T.

Conclusion

Oriented polyethylene pressure-sensitive tape and film have been found to be exceptional electrical insulating materials for splicing all types of cables in the field at high voltages and high frequencies. These materials have the desirable chemical, physical, mechanical, and electrical requisites for durable field application. As protective packaging sealants they combine ease of application with the physical characteristics necessary to a vapor- and moisture-impervious sealing barrier. Their unusual combination of electrical, moisture barrier, aging, and mechanical superiority is of great interest in corrosion-protection applications.

Acknowledgment

The author gratefully acknowledges the cooperation received from the Habirshaw Cable and Wire Div., Phelps Dodge Copper Corp., for determining certain of the electrical data.

General Characteristics of Pressure-Sensitive Tape and Film.

Backing material	Oriented polyethylene film
Caliper of backing	4 to 10 mils
Color	Commonly black, others available
Type of adhesive mass	Synthetic rubber base
Caliper of adhesive mass	2 mils
Tensile strength	To 3 lb./mil/in. width
Elongation at break	100%
Tearing resistance	Approximately 145 gm./film mil (Elmendorf)
Adhesion to own backing	Approximately 22 oz./width in.
Adhesion at low temp.	Good
Tack	Good
Adhesive transfer	None at normal temperatures
Resistance to creep	Some creep if stretched when applied
Water-vapor transmission	0.25 gm./24 hr./100 in.^{2}
Aging performance	Excellent
Solvent and oil resistance	Excellent against aqueous systems and highly polar solvents: Limited applicability with oils and non-polar solvents.
Flame resistance	Flammable
Abrasion resistance	Fair
Maneuverability	Good

S. P. E. Technical Conference

THE Seventh Annual National Technical Conference of the Society of Plastics Engineers, Inc., will be held on Jan. 18–20, 1951, at the Hotel Statler in New York City. Theme of the conference will be "Plastics Shape the Future." Morning and afternoon sessions will present an integrated program of technical papers reviewing the achievements in plastics during the past 50 years and forecasting developments during the coming half century. The whole range of the plastics industry will be covered—materials, machinery, processing, finishing, and applications.

In addition to the technical sessions, the conference will include luncheon and banquet meetings and other special activities including an organized program for the ladies. All interested parties are invited to attend the sessions. Registration fees will be $5.00 for S.P.E. members, $7.50 for non-members, and $2.00 for ladies. The luncheon (for S.P.E. members only), will be $3.50 per plate; the banquet $7.50 per plate. Door prizes and table favors will be distributed at the luncheon, and favors for the ladies at the banquet. The complete conference program follows:

Thursday, Jan. 18

Morning Session: Presiding—Stanley Bindman, Gemloid Corp., and co-chairman of Conference Committee.

9:45 — "Underwriters' Laboratories' Viewpoint on the Use of Plastics." Karl S. Geiges, associate electrical engineer, Underwriters' Laboratories, Inc., New York, N. Y.

10:30—"Properties, Applications, and Processing of Rigid Vinyls." C. E. Parks, manager, Product-Development Laboratory, B. F. Goodrich Chemical Co., Cleveland, Ohio.

11:15—"Plastics Industry in Great Britain." Howard Vincent Potter, chairman and managing director, Bakelite, Ltd., London, Eng., representing the British Plastics Federation.

12:00 noon—S.P.E. Annual Luncheon and Business Meeting (for members only): **Presiding—C.** Todd Clark, F. Burkart Mfg. Co. and S.P.E. 1950 national president. Luncheon speaker—Frank H. Carman, in charge of plastics materials activities for the Manufacturing Chemists' Association, Inc., Washington, D.C. Title of Mr. Carman's address: "Materials Supply Prospects in 1951."

Afternoon Session: Presiding—Dr. Russell B. Akin, E. I. du Pont de Nemours & Co., Inc., and 1950 president of Newark Section, S.P.E.

3:35—"A Family of High Speed Thermoset Plastic Molding Materials." Michael A. Brown, Jr., manager, Sales Promotion Department, Plaskon Div., Libbey-Owens-Ford Glass Co., Toledo, Ohio.

4:30—"Molding and Extrusion of Teflon." David D. James, product specialist in Field Service Laboratory, E. I. du Pont de Nemours & Co., Inc., Arlington, N. J.

Friday, Jan. 19

Morning Session: Presiding—James C. Growley, Celanese Corp. of America and co-chairman of Conference Committee.

9:30—Panel discussion on "Injection Molding Machines of the Future." Moderator—Islyn Thomas, president, Thomas Mfg. Corp., Newark, N. J. Panel Members: J. F. Hronek, sales and service representative, Plastics Div., The Fellows Gear Shaper Co., Springfield, Vt.; David J. Sloane, vice president, Lester Engineering Co., Cleveland, Ohio; Albert Spaak, chief engineer, De Mattia Machine & Tool Co., Clifton, N. J.; George W. Whitehead, sales manager, Plastic Molding Machinery Div., Improved Paper Machinery Corp., Nashua, N. H.; James S. Wilson, manager, plastics machinery sales, The Watson-Stillman Co., Roselle, N. J.

11:00—"After-Treatment of Molded Polystyrene Parts." Charles T. Snyder, technical specialist in plastics, Koppers Co., Inc., Pittsburgh, Pa.

Afternoon Session: Presiding—Arthur S. Jacobs, Renwal Mfg. Co. and Program chairman of Conference.

1:45—"Conditioning Phenolic Materials for Stability in Molding." Jerome L. Formo, supervisor of Plastics Laboratory, Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

2:30—"Polyesters." Dr. Karle S. Ebers, sales manager, plastics and resins, Naugatuck Chemical Div., United States Rubber Co., Naugatuck, Conn.

3:15—Symposium on "Distribution and Production Picture on Large Injection and Compression Moldings." Four speakers from Plastics Div., Monsanto Chemical Co., Springfield, Mass., as follows: Edmond D. Kennedy, manager, advertising and sales promotion; Edwin L. Hobson, sales manager, thermoplastic molding materials; Frank J. Donohue, manager, technical service, thermosetting molding materials; Sanford E. Glick, head, technical service, thermoplastic molding materials.

7:15—Annual Banquet. Presiding—The new S.P.E. national president for 1951. After-dinner speaker—John P. Coe, vice president, United States Rubber Co., New York, N. Y., and general manager, the Naugatuck Chemical and Synthetic Rubber Divisions. Title of address: "Synergism."

Banquet will be followed by an entertainment program and an evening of dancing.

Saturday, Jan. 20

Morning Session: Presiding—Samuel Silberkraus, Riverdale Laboratory and 1950 president of New York Section, S.P.E.

9:30—"Plastisol Molding." C. W. Patton, manager, coating and adhesive materials, Thermoplastics Dept., Bakelite Div., Union Carbide & Carbon Corp., New York, N. Y.

10:15—"Designing Better Plastics Products." Carl W. Sundberg, Sundberg-Ferar, industrial designer, Detroit, Mich.

11:00—"Masking Problems in Manual and Automatic Spray Painting of Molded Plastic Parts." Hamilton E. MacArthur, treasurer and general manager, Conforming Matrix Corp., Toledo, Ohio.

11:45—Presentation of prize-winning papers in the S.P.E. 1950 Prize Papers Contest.

Potted Amplifier in Hearing Aid

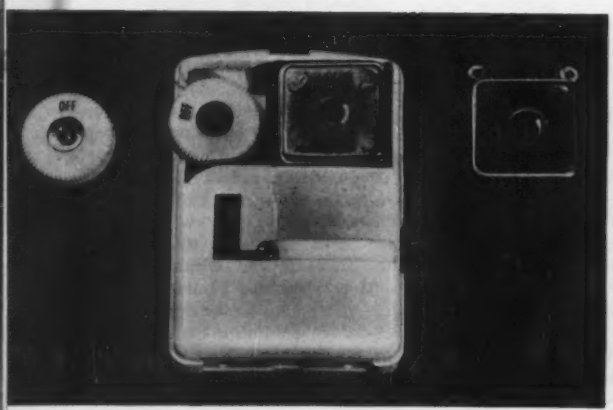
Polyester resin seals printed circuits; other plastics parts used

New hearing aid nests securely in right-hand end of case; battery rejuvenating unit is protected by molded urea platform with provisions for holding "A" and "B" batteries and with opening through which the scale of the battery testing meter can be viewed

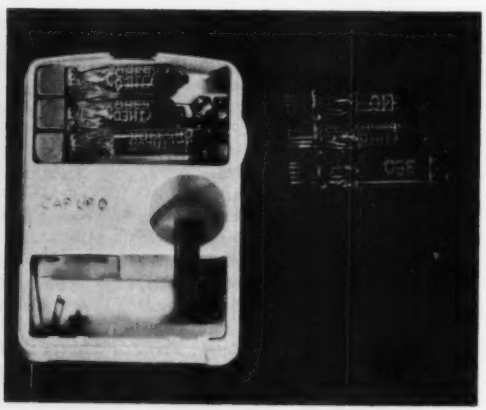
WITH the introduction of smaller vacuum tubes and such improvements as the printed circuit, hearing aids have grown increasingly compact and efficient. And plastic materials have won a steady job in this field, not only in such exterior applications as ear plugs and hearing aid housings, but also in many of the interior parts as well.

There are at least three features of the new Microtone Sealed Power Ten hearing aid, manufactured by The Microtone Co., St. Paul, Minn., which make it of interest to the plastics industry. Several components of the unit, involving complex and fragile design, are injection molded to rigid specifications in order to insure dimensional stability. Secondly, a new technique utilizing a casting plastic is employed to seal the amplifier assembly into a moisture-proof, life-time unit. Finally, this hearing aid is sold in conjunction with a special type of battery-rejuvenating device, also involving plastic parts, which sets it completely apart from other hearing aids now on the market.

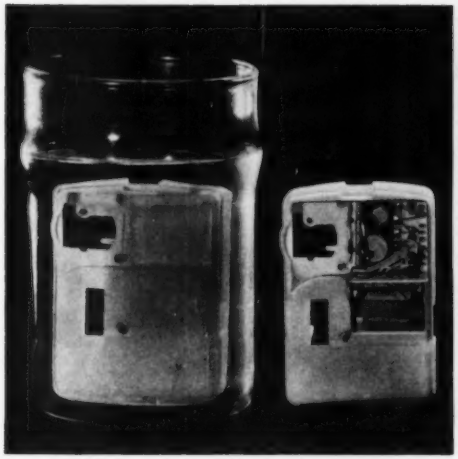
The Microtone Lifetime hearing aid, forerunner of today's smaller, lighter Sealed Power Ten, was designed to overcome two of the major problems of hearing aid users—the



Center: case frame and amplifier unit. Upper left: styrene volume control. Upper right: microphone which is quickly detachable from the amplifier assembly



View of the other side (see photo at left) of the amplifier assembly, showing battery compartments and vacuum tubes



Stripped amplifier unit is so perfectly sealed by cast polyester resin that it can be immersed in water without damage

Sealing the hearing aid amplifier. A hypodermic needle is used to introduce the liquid resin which is then cured at 65° C. in an enclosed electric oven

frequent servicing required on many aids and the high battery replacement costs which often reach a total of $5 per month. The solutions to these problems were so successful in practice that they were applied in designing the new unit. It is reported that the battery-rejuvenating device reduces the battery replacement cost to hearing aid users by more than 50 per cent.

Because of the inflexibility of the single plate printed circuit, The Microtone Co. decided to employ an amplifier made up of two smaller plates and to cast it into a solid block of plastic. The amplifier housing parts, which must fit together perfectly, are comprised of three Lucite acrylic injection molded parts produced by Minnesota Plastics Corp., St. Paul, Minn.

Styled by Harold Darr and Assoc., Minneapolis industrial designer, the entire unit is scarcely larger than a pack of cigarettes. The two-part case is held together by means of a piano-type hinge which provides nearly 180° opening.

Polyester Casting

After assembly of the amplifier into the case frame, and after complete testing and inspection, the casting resin is introduced into the interior of the unit by means of a hypodermic needle. The liquid plastic permeates every part of the circuit, completely supporting all components and connections so that failure cannot occur due to vibration or shock. The resin used for this purpose, a polyester produced by Resinous Products Div., Rohm & Haas Co., Philadelphia, Pa., is cured for 1½ hr. at 65° C., using an enclosed electric oven with forced air circulation. The method employed for injecting the liquid resin into the amplifier and case frame assembly is illustrated in the photograph at top right, this page.

Moisture resistance of the plastic material, when cured, is many times that of the wax compounds customarily used to protect transformers, paper condensers, and other hearing-aid parts. The potted amplifier is thus a sealed assembly in a solid structure, permanently guarded against moisture and vibration and designed to operate indefinitely without trouble or servicing. With volume control, microphone, and tubes stripped off, the amplifier may even be immersed in water without damage to the electrical components.

Since the instrument is so designed that the microphone, tubes, and volume control all attach to the Sealed Power amplifier casing, any of these parts can be replaced by a dealer in a few seconds. No additional servicing is required. The small styrene plugs and volume control wheel are molded by Microtone on its own injection equipment.

The Micro-Mizer unit, which repeatedly restores the hearing aid batteries to operating strength overnight, doubles as a battery tester and presentation case for the Microtone Lifetime instrument. The stock jewel case employed for this purpose is of hinged construction, with an ivory colored covering of simulated pigskin Pyroxylin-coated fabric. This case is supplied by Farrington Mfg. Co., Boston, Mass. The right-hand portion of the case is fitted with a compartment into which the hearing aid nests securely.

Urea Platform

The battery restoring unit itself, which is compression molded of ivory general-purpose urea material by Rainbow Plastics, Minneapolis, Minn., occupies the left side of the presentation case. This platform-like component has receptacles on the outer edges into which the "A" and "B" batteries may be slipped for recharging. A cored opening permits the face of the battery-testing instrument to be observed. Two spring-return slide switches, one for the "A" cell and one for the "B" battery, are provided to switch the circuit momentarily from the charge to the test position. The reverse side of this casting has cored bosses for assembly purposes, and several blind openings into which instrument parts are inserted. An opening in the side accommodates the power cord plug, and is produced by a hand-operated side core in the mold. The part is produced in a single-cavity mold, using electronically preheated preforms for the operation.

SPECIFY

HOBBED CAVITIES by MIDLAND

Home of the largest hobbing press in the plastics industry, Midland Die and Engraving is the ONE source qualified, equipped and manned to handle every Hobbed Cavity requirement—from the smallest tooth paste tube caps to radio cabinets, escutcheons and housings up to 80 square inches—nearly three times as large as ordinary hobbing limits. Typical examples of large hobbed cavities by Midland are the portable radio cabinet, radio cover and toy gunstock shown here. Midland engineering, experience and facilities are ready to serve you—ready to deliver *on time* uniform, accurate hobbed cavities at a fraction of machining costs. Specify Hobbed Cavities by Midland on *your* Bill of Materials. Or write for further information and estimates. No obligation.

MIDLAND DIE AND ENGRAVING COMPANY

1800 W. BERENICE AVENUE • CHICAGO 13, ILLINOIS

Makers of Plastic Molds • Die Cast Molds • Engraved Dies • Steel Stamps • Hobbings • Pantograph Engraving

ENGINEERING PROGRESS IN 1950

A SURVEY of engineering developments during the past year shows that, while the plastics industry has continued to advance with great strides, it has also been consolidating the gains made during 1949. Among other things, it has been learning how to use, at peak capacity, the many diversified and larger-capacity pieces of equipment which were made available in 1949 by the machinery companies.

New processes, which a short time ago were in the "laboratory" stage, have been placed in full scale, profitable production. While a few new machines were placed on the market, emphasis during 1950 was on increased efficiency through the use of improved materials which permitted much larger pieces to be molded.

Improved finishing and decorating methods, as well as techniques of fabricating which opened new fields for thermoplastic sheet stock were reported. There appeared to be a marked absence of the aura of secrecy which has previously made the reporting of important developments so difficult. As the industry has continued to grow, it has come to realize that details of major advances in production methods and machines must be made available to all. Such reciprocity of disclosure is of far greater benefit to all than if individual companies withheld their own secrets.

Announcement of a 200-oz. injection machine was made in August, at which time it was described as the largest in the world. This machine, made by The Watson-Stillman Co., Roselle, N.J., and delivered to A. L. Hyde, Grenloch, N.J., has a platen area 60 by 40 inches. On another page of this January issue the same machinery manufacturer has announced the delivery of two injection machines with platen areas approximately 4 by 6 ft. and able to shoot 300-oz. per shot.

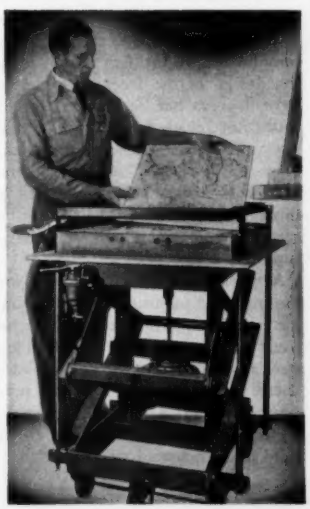
FORMED PRINTED SHEETS

THE technique of producing three-dimensional objects by forming printed flat thermoplastic sheets, while maintaining close registry of the printed information on the formed sheet, is relatively new to the plastics industry.[1] In the past three years, the Army Map Service, Washington, D.C., has carried on a development program in extension of the original work done in the early 1930's by J. J. Braund, Coast and Geodetic Survey, to determine the feasibility of printing flat maps on thermoplastic sheets and forming them into three-dimensional relief maps.

The formed plastic relief maps are produced from flat sheets, printed in the same manner as the paper maps printed by the Army Map Service. They are printed by offset lithography on matte vinyl sheet 0.015 in. thick. The master model of a relief map is constructed from a flat contour map. Templates representing contours (lines of equal elevation) are cut on a duplicator from cellulose acetate sheets. Each template or sheet represents one contour elevation. The completed templates are stacked and laminated into a step block, and modeling clay is applied to fill in and smooth the surfaces between the steps or contour edges. A plaster negative is made over the master, and the production molds are then made from this negative. By using a male or positive mold design, the peaks are formed first with no printing inaccuracies, and the thinning and distortion in the low areas are greatly reduced and of secondary importance. Distortion is measured by printing ⅛-in. grids on flat sheets, forming the sheets, and measuring the distortion of the grids. Draws up to 6 in. have been made without enlarging the grids more than double.

The mold is a vital part of the

Finished three-dimensional map is removed from mold after being formed



* Reg. U.S. Pat. Office

[1] MODERN PLASTICS, September, 1950, p. 105.

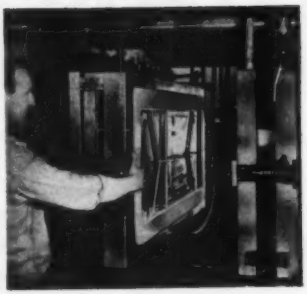
vacuum system. The self-enclosed vacuum system is designed so that there is no stress on the mold, because when the air is evacuated, the atmospheric pressure is equal on the top and bottom surfaces. Vacuum holes throughout the mold are interconnected and tied to a ¾-in. feed pipe embedded in the mold. Sheets of wire mesh sealed against the back of the mold provide the air passage to the feed pipe. A globe-type quick-action valve is connected to the feed pipe at one side of the mold. Vacuum is suppplied by a 2-hp. pump, which is of sufficient capacity to service two map-size molds in alternating use.

The printed sheet is placed against the back stops, and the mold is raised to clamping position. A radiant heater with Fiberglas insulation is positioned over the mold for approximately 10 seconds. No vacuum is exerted until the end of the heat cycle, at which time a full vacuum surge is exerted and the mold is immediately lowered to release the piece.

BREAKER FRAME

BELIEVED to have largest outside dimensions of any injection molding produced, thus far, a one-piece freezer breaker frame[2] is now being made for Crosley by Panelyte Div., St. Regis Paper Co., Trenton, N.J. The production of this part was complicated by the fact that, due to the design of the freezer, it had to have a cross bar so located that it could not be used as a runner and also precluded the use of the usual cross or X-shaped runner system. The problem was solved by using a three-plate mold incorporating a system of primary and secondary runners.

A special long nozzle was built for the machine in order to reduce the sprue length. The primary sprue feeds into two main runners which were machined into the sprue plate. These runners extend from the primary sprue to a distance approximately half-way to either end of the mold, and in turn feed through restricted gates into two intermediate sprues. These intermediate sprues extend through the middle plate. Each, in turn, feeds into a pair of secondary runners. The secondary runners feed into the molded piece through restricted gates. There are four gates.



Hydraulic jacks separate the plates of the mold for the large breaker frame

In order to separate the main sprue from the nozzle, the mold had to open between the middle plate and the sprue plate while the main cavity remained closed. To accomplish this a pair of hydraulic jacks was utilized.

When the mold opens, the floating and sprue plates part. The diamond-pointed sprue puller breaks the main sprue at this point. As the center plate reaches its final point of travel and stops, the main cavity starts to open. At this point the diamond-pointed sprue puller pulls free, and the secondary sprues are broken from the primary runner.

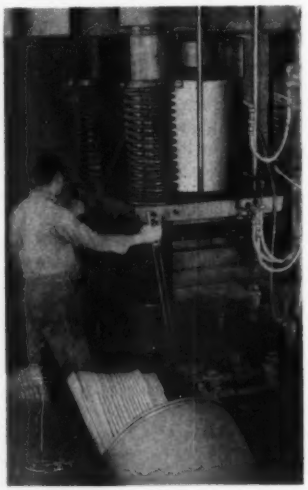
The overall dimensions of the finished mold are 62 by 32 by 14 in., and the mold weighs 5 tons. The die area of the standard 48-oz. press used was increased to 40 by 62 in., and a 60-oz. heating cylinder was incorporated in the equipment.

ACCUMULATOR OPERATION

ONE large and successful custom molder who has been a compression molder for 30 years—and in the injection field practically since that method was first used in the United States—permitted MODERN PLASTICS to disclose[3] for the first time the details of its special methods and machines which are used for injection molding.

Basically, the machines designed and used by Mack Molding Co., Wayne, N.J., are vertical, upward-acting, transfer-type presses, with special castings for the heads and pressure pots. A movable heated bolster plate is located between the movable press bed and head. The injection piston is permanently fixed on the under-side of the head of the press.

The injection molding operation with this type of equipment is accomplished as follows: With the injection chamber loaded with material, practically all of which is plasticized, hydraulic pressure is admitted to the main ram. As the ram moves upwards, the two halves of the mold meet and close. As the ram continues upward, it raises the assembly composed of the press bed and the lower half of the mold, the upper half of the mold, the bolster plate, and the injection chamber. As these components continue upward, the fixed injection ram enters the injection chamber or cylinder. The entrance of the ram into the chamber creates pressure on the molding material; as the upward movement



Starting the cycle on transfer-type accumulator-operated injection machine

[2] MODERN PLASTICS, September, 1950, p. 97.

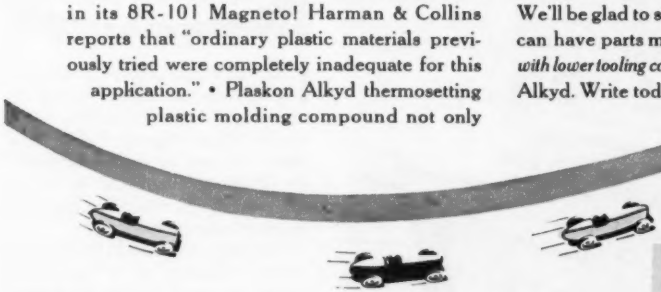
[3] August, 1950, p. 79.

How to keep 25,000 volts on the right path!

Harman & Collins 8R-101 Magneto is primarily designed for Ford V-8 engines used for racing and industrial power. Plaskon Alkyd rotor-switches and insulators used in this application are molded by Prisk Plastic Molding, Alhambra, Calif.

another example of how PLASKON ALKYD improves the performance of electrical equipment

It takes a plastic with high dielectric strength, high arc resistance and high dimensional stability to harness and keep a 25,000 volt output "on the right path". That's why Harman & Collins chose Plaskon Alkyd for insulators and rotors in its 8R-101 Magneto! Harman & Collins reports that "ordinary plastic materials previously tried were completely inadequate for this application." • Plaskon Alkyd thermosetting plastic molding compound not only possesses unusual electrical and mechanical properties which provide better performance in finishing products. It can be molded *faster* at lower pressures on conventional or fully automatic machines, utilizing simple, less expensive dies. We'll be glad to send information on how you can have parts molded *faster, better, and with lower tooling cost* using Plaskon Alkyd. Write today.



PLASKON DIVISION • LIBBEY • OWENS • FORD GLASS CO.
2121 Sylvan Avenue • Toledo 6, Ohio
In Canada: Canadian Industries, Ltd., Montreal, P.Q.
Branch Offices: Boston, Chicago, New York, Rochester, Los Angeles
Manufacturers of Molding Compounds, Resin Glues, Coating Resins

PLASKON® ALKYDS

continues, plasticized material is forced out of the bottom of the injection chamber through the sprue hole, along the runners, through the gates, and into the cavities of the clamped mold. Thus, one hydraulically operated ram accomplishes both clamping of the mold and injection of the material involved.

AXIAL PLUNGER PUMP

A NEW hydraulic pump, suitable for operating all types of hydraulic molding presses—compression, transfer, and injection—was announced early in 1950.[4] The pump, called the Electraulic Axial Plunger Pump, features principles of design which are said to be entirely new. The pump plungers are located in a circle around the drive shaft and are parallel to it. The rotary motion of the drive shaft causes the pump plungers to reciprocate axially through the action of a "swashplate" mechanism carried by the shaft.

This equipment was produced by Towler Brothers (Patents) Limited, Rodley near Leeds, England, to be used for pressure generation in the Electraulic Direct Hydraulic Systems for machine and press use.

In the design of the pump, all heavily loaded ball and roller bearings have been eliminated. The one roller bearing required holds the shaft and swashplate in a concentric position with no thrust load. Heavy axial thrust loads are all carried on oil-film lubricated thrust bearings on both faces of the swash member.

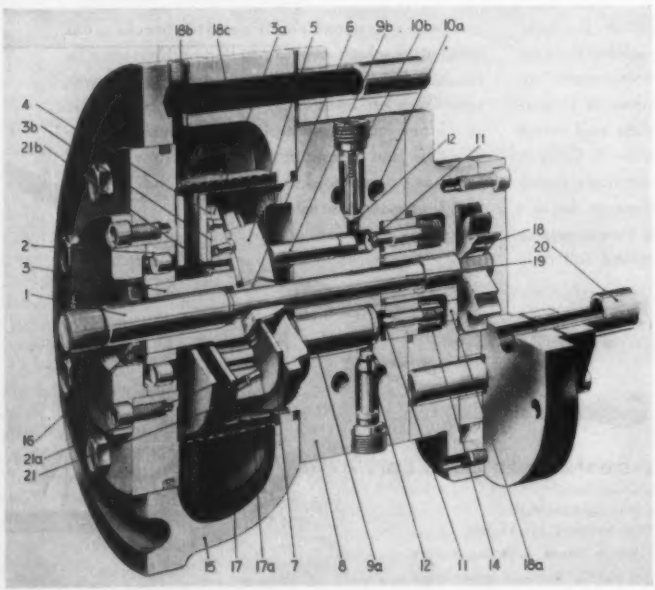
The plane of the front face is at an angle oblique to the drive shaft. This face backs up a "wobble" plate through the second oil-film bearing. The wobble plate rides freely on a short journal bearing carried by the swashplate, and its forward surface directly contacts the outer ends of the pump plungers. These ends have a semi-spherical shape to provide a large radius of contact between them and the face of the wobble plate surface at all times through pressure loading. This feature eliminates the need for a system of connecting rods with jointed terminals between swashplate and plungers. A bevel-geared connection between the wobble plate and the stationary pump body controls the relative motion between the face of the wobble plate and the plunger ends. This avoids dragging with its resultant scuffing and wear.

The gear ratio is such that the wobble plate is positively constrained to revolve at the correct speed to insure rolling contact between the plunger ends and the face of the wobble plate. The path of this rolling contact of each plunger on the wobble plate surface is epicycloidal. The swashplate mechanism is contained in an oil-tight housing which is arranged for face mounting directly on the end bell of the electric driving motor with a flexible shaft drive coupling housed in an intermediate section.

The high pressure pump body, mounted directly to the outer end of the drive housing, is stationary and contains the cylinder bores in which the plungers operate with a packless precision fit. A built-in low pressure gear pump, mounted directly to the outer end of the pump body, is powered through an extension of the drive shaft. This auxiliary pump serves primarily as a low pressure booster, delivering the operating oil under a light pressure to the high pressure cylinders through their intake valves to maintain the high pressure plungers in contact with the wobble plate.

[4] MODERN PLASTICS, February, 1950, p. 81.

Section through axial plunger pump, showing (left) swashplate drive mechanism; (center) high pressure plunger pump; and (right) low pressure gear-type booster pump

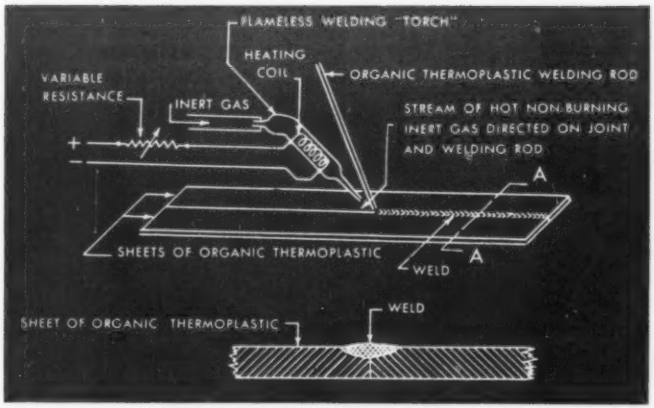


HOT GAS WELDING

THROUGH the process of welding, it becomes possible to extend the size of all-plastic assemblies to an almost infinite degree. Welding also offers a means of producing shapes not otherwise obtainable, as well as of repairing and rebuilding damaged thermoplastic components.

The equipment used in one welding process[5] consists of a hot-gas or "flameless" torch, pressure regulator, and filler rod. The gas welding torch permits the regulation of the temperature of the stream of hot gas or air by varying the flame which heats the coil. The electric torch is heat-regu-

[5] MODERN PLASTICS, November, 1950, p. 97.



Diagrammatic view of electrically heated hot-gas welding gun. Guns are also heated by combustible gas. At bottom: Cross-section of a weld made in thermoplastic sheet

lated by a thermoswitch. The temperature of the stream of hot gas may be further regulated through the gas pressure and also by varying the distance between the tip of the torch and the weld piece. In any case, the temperature at the orifice should be between 400 and 600° F.

In plastics welding, a simple bonding process takes place between filler rod and material, since only the actual meeting surfaces melt; the other parts, such as the center of the rod, remain relatively unaffected and rigid. The slight pressure that is applied to force the filler rod into its "bed" has the effect of combining the melted surfaces into one homogeneous mass. In this manner, a bonded, integral weld is produced.

In order to produce uniform coalescence it is essential that the torch be used to pre-heat the surfaces or edges to be welded as well as the filler rod before insertion into the weld. The filler rod cannot adhere to the parent material if the surfaces have not been sufficiently pre-heated and melted. Overheating, on the other hand, causes a darkening of the material and too much sub-surface melting. The preliminary heating of the filller rod should be confined to an area of about ½-in. from the tip of the rod.

Two variable factors in the process make it possible to adjust the process to the particular properties of the kind of plastic to be welded. These factors are the pressure applied to the filler rod and the angle at which the welding takes place. For welding polyvinyl chlorides, the filler rod should be almost perpendicular to the weld piece, while for the softer polyethylenes the more advantageous angle is 45°. A slight weaving motion of the hot gas stream prevents under-cutting.

METALLIZING

THE commercial application of evaporated metallic coatings to plastics has been made possible by the recent development of a new process[6] known as the "high vacuum metal evaporation technique." Both from the standpoint of economy and serviceability this new process compares favorably with either silver reduction or electroplating. Finishes in aluminum, copper, gold, Inconel metal, nickel, and silver can be obtained by this technique in which metals are evaporated from sources in a high vacuum chamber and condensed on all surfaces in direct line from the source.

Three basic techniques have been developed for application of high vacuum to metallization:

1) Objects held stationary within the vacuum chamber where coating is required on one side only.

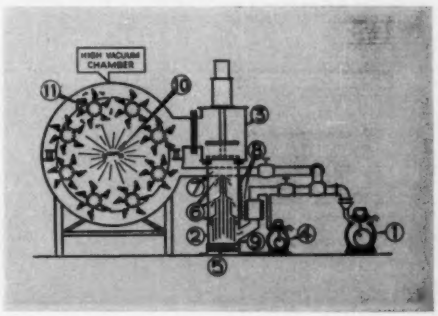
2) Objects held by rotating jigs within the vacuum chamber. This method is used for irregularly shaped objects which require coatings over their entire surfaces.

3) Continuous lengths of material fitted on a rewinding mechanism within the vacuum chamber as in the case of continuous rolls of plastic films and fabrics.

To obtain high gloss, fill-in coats of lacquer or varnishes may be necessary, since the appearance of the metal coatings depends on the surface characteristics of the base upon which they are deposited. Solvents may be employed to cause reticulation of the surface of the base plastic to obtain wrinkled and brushed finishes. All commercial techniques of application of these fill-in coats are satisfactory. Special consideration must be given to the formulation of these fill-in compositions, however, and particular care must be taken to insure complete dryness of the fill-in coat prior to the vacuum metallizing operations. The plastic compositions and the fill-in coating must have a low enough vapor pressure to allow the vacuum system to produce a pressure of 0.5 micron or less.

Variations in color tones of the metallic finishes are generally ob-

[6] MODERN PLASTICS, April, 1950, p. 135.



Schematic layout of high vacuum metallizing system, showing mechanical pump (1); diffusion pump (2); holding pump (4); source of vaporized metal (10); and rotating holding jigs (11)

tained by tinting the top-coat lacquers or by dyeing. A range of metallic appearance can be had by this technique, varying from all tones of gold through copper, and virtually including all the colors of the total spectrum.

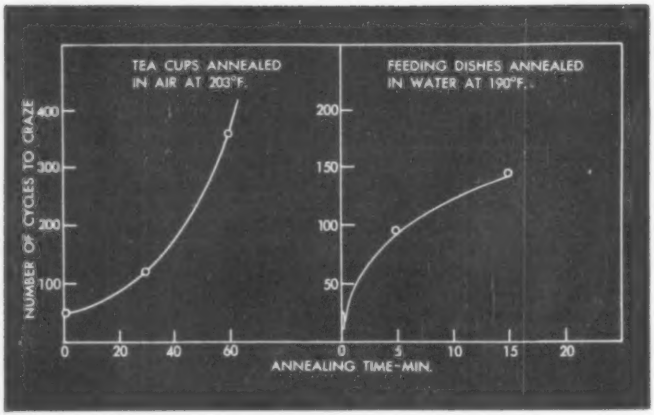
ANNEALING STYRENE

IN ITEMS where durability is a factor, annealing of injection-molded styrene often justifies the cost of an extra operation and of the equipment involved.

In Monsanto's approach to the various problems involved in annealing styrene[7] both circulating air ovens and water baths were found to be suitable. In investigating to determine the highest allowable annealing temperature for a reasonable exposure period, the following procedure was used: one molding was annealed at the heat distortion temperature of the plastic; the temperature was then raised or lowered until a molding showed slight distortion after 30 min. of annealing. The annealing temperature selected for testing work was usually 4° F. below this figure.

Moldings were annealed for various periods of time at the temperature thus selected, were allowed to cool in air to room temperature, and were then ready for testing. An optimum annealing time could be determined by the results of accelerated tests, which would also indicate the comparative durability of the items conditioned.

Kerosene and thermal cycling tests were both employed. The former is rapid and gives a qualitative picture of durability; the latter is more laborious but has the advantage of being semi-quantitative and of simulating conditions of use more closely. All the items which failed the kerosene test were made satisfactory by a simple annealing treatment. The performance of styrene articles expected to withstand the thermal shock of hot foods and dish-washing was tested by the hot-cold water method. Thermal shock resistance was shown to be improved as much as seven-fold by annealing.



Curves show improvement in thermal shock resistance of injection-molded styrene articles after having been annealed for various periods of time in hot air and in hot water

[7] Modern Plastics, August, 1950, p. 83.

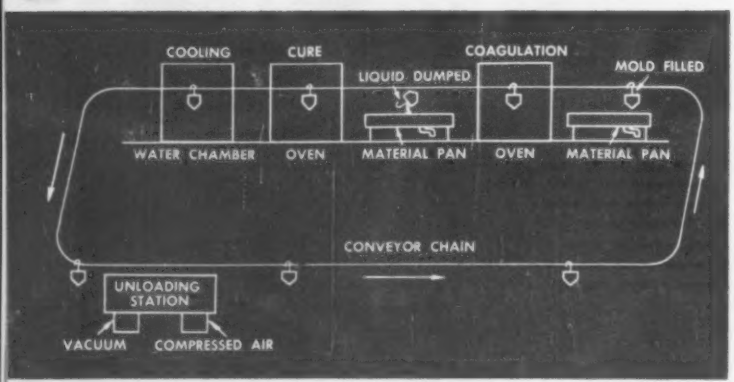
SLUSH MOLDING

AMONG the advantages of slush molding of vinyl plastisols[8] to produce hollow, flexible articles are the facts that articles can be produced from inexpensive molds in relatively large quantities if desired, that duplicate molds are readily made, and that the molding equipment is comparatively simple.

Slush molding consists of producing the desired thickness of plastic material on the inside wall of a mold, curing the plastic, and then removing the finished part from the mold without distortion or tearing. In the molding of a plastisol, the vinyl resin is coagulated or partially cured by applying oven heat quickly and evenly to all sections of the mold. Final curing takes place in a second oven.

In practice, the molds are usually placed on a conveyor belt having positions for as many molds as the operator wants to run. The plastisol material is poured into a mold until it is filled to the top. This mold is then placed on the conveyor belt and carried through an oven where

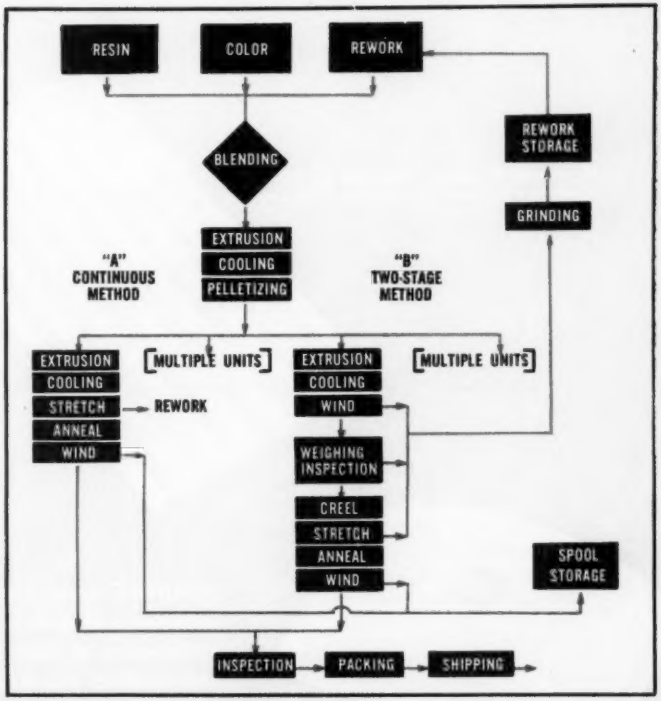
Simplicity of slush molding operation is shown by this schematic diagram of conveyorized set-up. Variable speed drive, themostats, and cooling controls are desirable



[8] Modern Plastics, October, 1950, p. 101.

temperatures between 500 and 600° F. cause the plastisol to jell or coagulate for a thickness of approximately 1/16 in. from the inside wall of the mold. If the mold is now turned upside down, the plastisol remaining in liquid form will be dumped out while the coagulated material will remain in place. The mold is then carried to the second oven where the coagulated part is completely cured. Passage through a cooling chamber cools the mold sufficiently to permit removal of the finished piece by blowing it out with compressed air or collapsing it with vacuum.

The first molds for this work are made by electro-forming over wax, the first layer being silver, the second nickel, and the third copper. The electro-forming is carried out until the total mold wall thickness is about 1/16 inch. After the electro-forming is completed, the wax is melted out. If additional molds are required, a number of vinyl parts are produced from the initial mold, on which the mold maker electro-forms duplicate molds which are identical with the original.



Flow sheet of two methods of extruding polyethylene monofilaments. The difference is in the method of handling the filaments after they leave the cooling water bath

MONOFILAMENTS

THE procedure for the extrusion and subsequent handling (orienting, annealing, and winding) of polyethylene monofilaments[9] consists of blending the resin and colorant to obtain the desired shade, compounding to put the resin in extrudable form, and extruding into strands. The extruded filaments are then cooled, stretched to increase tensile strength, annealed to obtain thermal stabilization, and wound onto spools for the weaver or converter.

The raw materials used in monofilament extrusion consist of the resin and the colorants. The virgin resin, color or master-batch, and (if used) the ground rework are blended in a mechanical mixer. This mixture is fed to an extruder which melts the resins, further disperses the pigments, and removes all foreign materials as the compound passes through the screens and strainer plate. The molten resin is then forced through a forming die into multiple rods, which are drawn into a water bath at a temperature of about 160° F. From here, the rods go to a chopping or pelletizing unit which cuts the 1/8-in. diameter rods into pieces about 1/8 in. long.

Next the compounded resin is extruded into filaments. The extrusion rate and temperatures are regulated to melt thoroughly the resin and destroy any crystalline or oriented molecular structure that might exist in the feed resin.

The filaments are extruded downward from the die into a water bath. The distance from the water to the die, the temperature of the water, and the length of the bath depend upon the capacity of the machine and the number and diameter of the strands.

A constant speed take-up is located at the end of the water bath to draw the filaments at a uniform rate; the diameter of the filaments is maintained by varying the extrusion rate.

There are two methods of handling the extruded material as it leaves the cooling tank. In the continuous method, the filaments are immediately oriented, annealed, and wound on spools ready for shipping. In the other method, the unstretched strands are wound on spools at a very low tension, and the rest of the process is made a separate and independent operation. The choice between the two methods depends upon the size filaments to be made and the size extruders to be used.

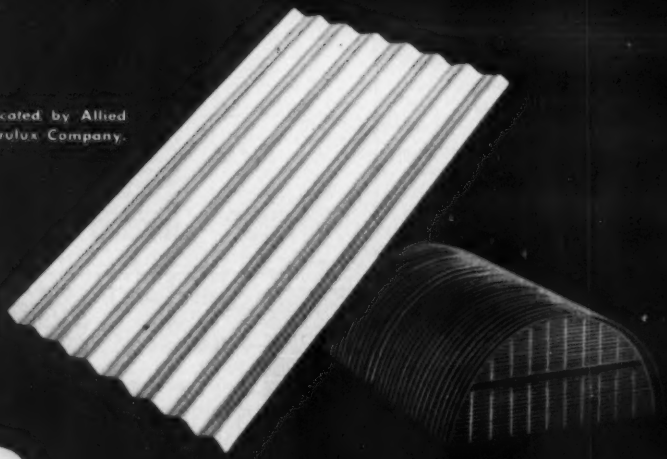
In the process of orientation, the extruded filaments are cold stretched to produce increased tensile strength and to reduce elongation. In this operation the material is changed from an amphorous form, where the molecules are not in any particular arrangement, to a crystalline structure, where they have a definite relationship to one another. The strands should be stretched sufficiently to remove all residual elongation and to start on the elastic elongation phase.

To thermally stabilize the filaments

(*Continued on p. 90*)

[9] Modern Plastics, July, 1950, p. 87.

#1. Structural panels fabricated by Allied Synthetics Co. and the Corrulux Company.



LAMINAC-molded products are stronger than steel, lighter than aluminum. They can be molded with or without pressure or heat. They assure dimensional stability and excellent electrical properties. Their color, molded-in, won't crack, peel or chip. And they offer phenomenal resistance to weather, heat, abrasion and impact.

#2. Cover for aerial camera film magazine, molded by Laminated Plastics, Inc. for Ryan Industries, Inc.

#3. Giant photometer molded by Lunn Laminates, Inc. for Westinghouse Electric Company.

translate LAMINAC® resin's special properties into

a bigger success story for your product

Here are just three successes that LAMINAC has made possible. Perhaps it can do as much . . . or more . . . for *you!*

success #1

LAMINAC structural paneling is almost as easy to work with as wood. Panels can be sawed, bolted, drilled or nailed without shattering or cracking. Though strong as steel, they're lighter than aluminum . . . need no special support in walls or ceilings. There's no rot, rust or warpage . . . no refinishing. And LAMINAC panels admit 80% of the light obtained through an open window—without glare.

success #2

LAMINAC replaced metal in cover for film magazine of aerial reconnaissance camera . . . slashing weight from *5.75* to 1.85 lbs. LAMINAC's heat resistance and insulating properties retain heat from low-wattage heater inside magazine, protecting film from atmospheric temperatures as low as –65 F.° LAMINAC cover also takes rough treatment, springs back into shape after impact that would permanently damage metal.

success #3

Giant photometer relies on LAMINAC's dimensional stability to measure accurately the output of 8-foot fluorescent lamps. The nine-foot two-inch sphere was easily molded at a fraction of the tooling costs required for metal. Cast in iron, instrument would have weighed *3500 lbs.* LAMINAC photometer's *700 lbs.* made easy work of delivery and installation and use.

Are you designing a new product—or redesigning an old one? LAMINAC may well help you make it lighter, stronger and perhaps less expensively. If you would like to know more about this unusual new material, write for your free copy of "The Story of LAMINAC Resins".

To see actual parts, visit the annual meeting of the Reinforced Plastics Section of S.P.I. at the Edgewater Beach Hotel, Chicago, Feb. 28–March 2.

reinforced plastics conference and exhibit
SPI 1951
EDGEWATER BEACH HOTEL
CHICAGO
FEBRUARY 28, MARCH 1, 2

AMERICAN Cyanamid COMPANY
PLASTICS DEPARTMENT
32 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

In Canada: NORTH AMERICAN CYANAMID LIMITED
Royal Bank Building, Toronto, Ontario, Canada

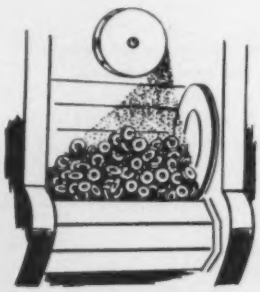
they are subjected to an annealing process following stretching. The stretched filaments are first passed through a bath at a temperature just under the softening point of the resin. In this bath, the filaments are prevented from shrinking by a pair of rolls running at the same speed.

The first annealing bath is followed by a second one at a slightly lower temperature. Here the filaments are allowed to shrink a predetermined amount under the control of differential rolls. This bath relaxes the tight or strained bond.

FLASH REMOVAL

CRUSHED apricot pits in a blast of air are being used to remove flash from thermosetting parts by the Wheelabrating process.[10] Briefly, this process combines tumbling of parts on an endless cradled belt with an overhead wheel throwing crushed apricot pits of 20 to 40 grit in a blast pattern across the tumbling area.

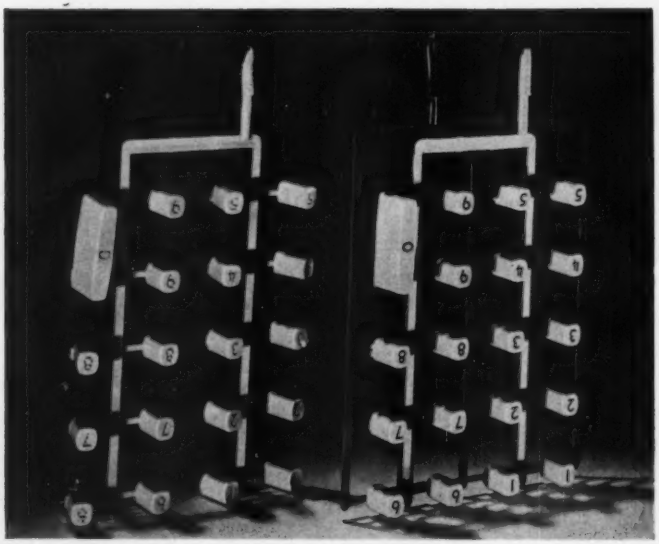
The dust problem was overcome by injecting steam into the flow of pits as they enter the blast mechanism. The moisture also appears to reduce the brittleness of the pits, thereby increasing their life. Abrasive is lost at the rate of approximately 1 lb. per hour.



Principle of flash removal process. Overhead wheel throws abrasive blast

It has been found that many parts can be run with the same machine settings. However, small parts of the ¼- and ½-in. variety which would be lifted by the blast and broken are placed in a small wire barrel which revolves on the belt. Very large parts which would be damaged at normal tumbling speed are tumbled at half speed, or the belt may be moved intermittently by means of an interval timer.

[10] MODERN PLASTICS, May, 1950, p. 91.



Samples from two-color molding job. Pieces at left, from first shot, show shells with bridging. Completed pieces, right, show characters filled-in with second color

TWO-COLOR MOLDING

AUTOMATIC two-color molding[11] in one process has been developed to replace the more costly method of using two separate molding operations and two separate molds.

The unit, built by The Hydraulic Press Mfg. Co., Mount Gilead, Ohio, is essentially a vertical downward-acting hydraulic mold clamp and two 4-oz. capacity opposed horizontal injection units. A unique four-station indexing mold permits two-color injection, cooling, and stripping to be performed simultaneously.

The new molding procedure is currently being used by Friden Calculating Machine Co., Inc., San Leandro, Calif., to mold-in characters on acetate keytops for its calculating machines.

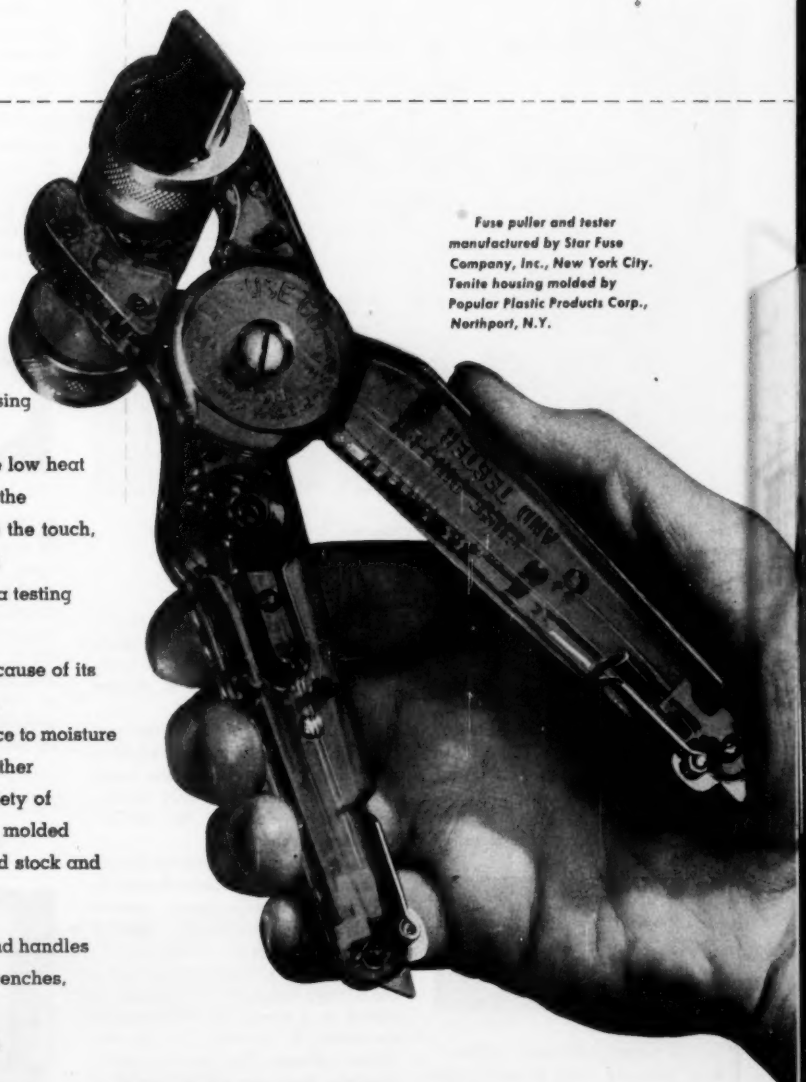
In the new molding procedure, the first injection "shot" produces the keytop shells which contain the impressions of the characters or numerals together with cross bridging for supporting the centers of numerals such as 9, 8, and 6.

As the vertical mold clamp raises and lowers, it indexes the carrier plate (containing the keytop shells) 90° in a clockwise position to a cooling station. On the next cycle, this carrier plate is automatically indexed to a second mold, where the core material of a contrasting color is injected into the shells forming the filled-in portion of the figures or letters. While the second color is being injected, another set of shells is being produced at the first injection station. The final press cycle indexes the finished keytops into position for stripping them from the carrier plate. The complete molding cycle takes 1 minute. The molded parts are ejected automatically.

The molds for this operation are built in three sections. The lower part, mounted to the stationary press bed, contains the core pins. Both lower molds are equipped with

[11] MODERN PLASTICS, February, 1950, p. 86.

powerful puller



Fuse puller and tester manufactured by Star Fuse Company, Inc., New York City. Tenite housing molded by Popular Plastic Products Corp., Northport, N.Y.

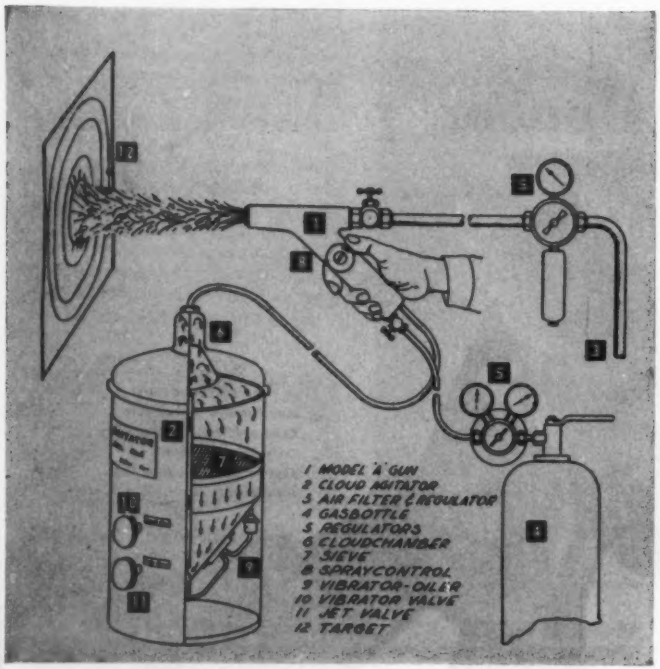
Housing this double-end fuse puller and tester in Tenite provides sufficient insulation against electric shock to permit use of the tool by the bare hands. Tough and resilient, the Tenite housing withstands continual gripping and pulling without breakage—while the low heat conductivity and smooth surface of the plastic keep the tool comfortable to the touch, easy on the hands. The transparent exterior makes possible visibility of a testing signal light in one handle.

Tenite is well adapted to tools because of its exceptionally high impact strength, extremely light weight, and resistance to moisture and perspiration under varying weather conditions. Available in a wide variety of chipproof colors, it may be injection molded to close tolerances or extruded in rod stock and fabricated to exact dimensions.

Tenite affords durable housings and handles for such tools as saws, hack saws, wrenches, pliers, screwdrivers, electric and pneumatic drills. For full information about the properties and many uses of Tenite, write Tennessee Eastman Company (Division of Eastman Kodak Co.), Kingsport, Tennessee.

TENITE *an Eastman plastic*

Information regarding Tenite is also obtainable through representatives located in Chicago, Cleveland, Dayton, Detroit, Leominster (Mass.), Los Angeles, New York, Portland (Ore.), Rochester (N. Y.), St. Louis, San Francisco, and Seattle; and elsewhere throughout the world from Eastman Kodak Company affiliates and distributors.



Flame-spraying gun and equipment used with it. Essential to the operation is uniform flow of air-powder mixture to gun, provided by special feeder shown at left above

stripper plates to guarantee that the molded parts remain in the carrier plates during indexing. Four carrier plates, one for each color mold and one each for the cooling and ejecting stations, are mounted in an indexing spider. These carrier plates contain the side wall cavities of the keytops. The mold sections mounted on the moving mold clamp platen contain the cavities which form the faces.

FLAME SPRAYING

FLAME spraying of polyethylene is now practical with a spray gun and process[12] perfected by E. I. du Pont de Nemours & Co., Inc., and American Agile Corp. Tests have shown that continuous coatings can be produced which are smooth in appearance, uniform in thickness, and exceedingly well bonded to the target. All tests have shown that flame-sprayed polyethylene has the same physical characteristics and resistance to chemical attack as molded or extruded material.

The adhesion of flame-sprayed polyethylene film to metallic surfaces depends on the surface of the target being clean and uniformly roughened. After cleaning, the surface should be preheated.

One of the most important factors in flame spraying of polyethylene is a dependable and constant powder supply. For this reason, powder feeders have been developed to make possible a uniform flow of the air-powder mixture. The powder is placed in a funnel-shaped receptacle which is agitated by an air-driven vibrator. The powder particles are then carried by air to a cloud chamber in the top of the powder supply unit. The cloud chamber is transparent, permitting the operator to observe the air-powder mixture and correctly adjust the jet valve. From the cloud chamber the powder and air are drawn by suction through a flexible hose to the gun which shoots it to the target.

The thickness of the sprayed polyethylene coating depends on the powder supply, the flame, and the hand movement of the gun. It is advisable to make the spraying passes approximately 2 in. wide and, immediately upon completion of one path, to overlap it until the desired thickness is reached. Using this technique, a coating thickness of 1/32 in. can be achieved with two passes. By carrying out the same procedure the coating thickness can be built up to 1/8-in. thickness and more. The heat supplied by the flame must be such that the powder melts upon striking the target and fuses to produce a smooth film. On small areas, sufficient time must be allowed for cooling to prevent local overheating.

12 MODERN PLASTICS, June, 1950, p. 85.

REINFORCED PLASTIC

HOUSINGS produced from Fiberglas mat bonded with a polyester resin for photo-electric engraving machines are being made by Le Conte Plastics Co., Babylon, N.Y. for Fairchild Camera and Instrument Corp., Jamaica, N.Y.[13] Since little if any pressure is used during molding of these housings and because a perfectly smooth surface is required on both sides of the finished housing,

(*Continued on p. 150*)

13 MODERN PLASTICS, December, 1950, p. 89.

Special resin pot is used in new technique for molding reinforced plastic

Ever since Farrel-Birmingham first developed the Banbury Mixer over thirty years ago, the design and construction of the machine has been continually improved and its operating efficiency steadily increased.

Improvements in operating techniques and in the design of the machine itself have resulted in greater uniformity and higher quality of mixes produced. Better production layouts have practically eliminated the manual handling of stock from the compound room and to succeeding machines.

THERE IS ALWAYS SOMETHING NEW

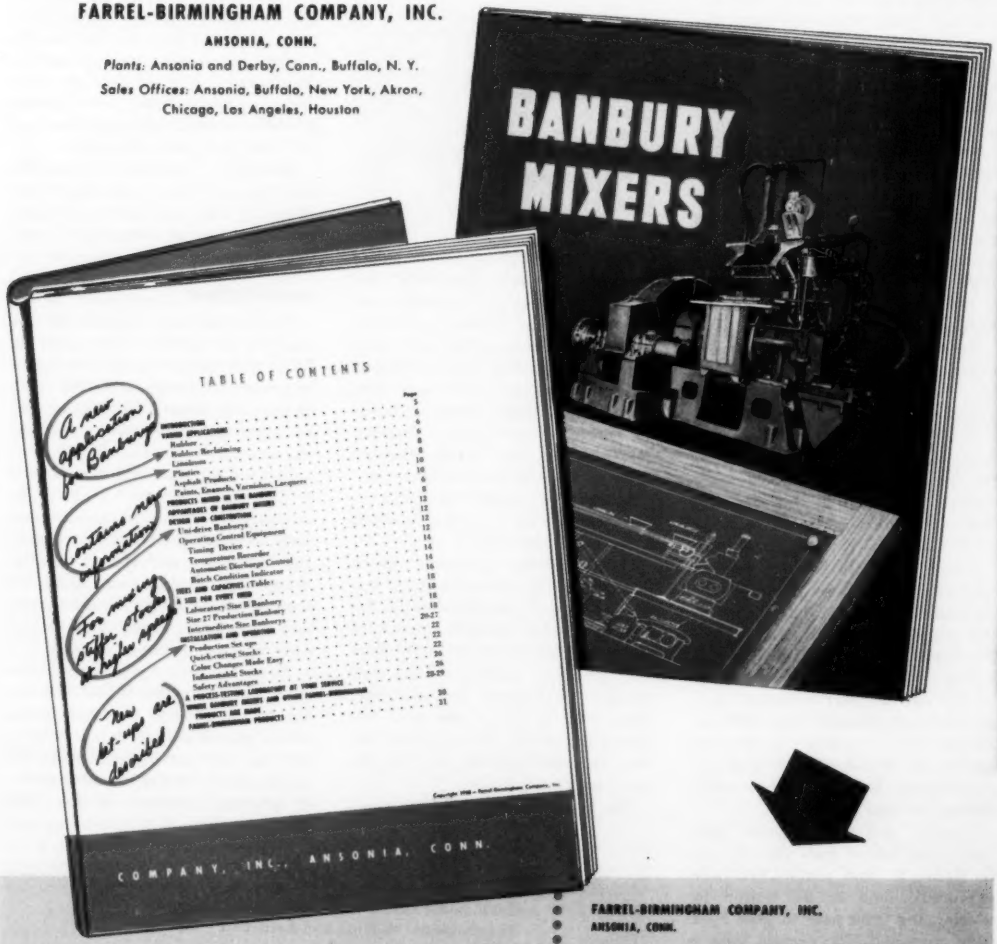
in Banbury Mixer Design

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONN.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Chicago, Los Angeles, Houston



The complete story of the latest Banbury developments is contained in this new bulletin. For your free copy, just fill out the coupon and drop it in the mail today.

Farrel-Birmingham®

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN.

Please send me without cost or obligation, a copy of your new Bulletin 189, "BANBURY MIXERS."

Name_____ Title_____

Company_____

Address_____

City_____ State_____

FB-449

MACHINES FOR PLASTICS IN 1950

FIRED with enthusiasm by ever-increasing business in 1950, injection molders rushed to manufacturers with more orders for machines than in any year since 1946. By the end of the year, some machine manufacturers were running so far behind schedule that they were setting delivery dates four or five months beyond receipt of order. According to a MODERN PLASTICS survey, around 690 injection machines of 3-oz. or more in size and 181 of less than 3-oz. size were delivered to customers in the United States in 1950. This compares with about 350 in 1949 and almost 1300 in 1946, the biggest volume year on record.

Readers will find considerable difference in the 1950 report in Table I when compared with previous years' totals because a complete recapitulation and checkup has been made on past years' surveys. By far the greatest difference has been created by adjusting the final figures so that machines of 2-oz. or under would be listed separately.

About the only 2-oz. machines now listed in the yearly total of Table I are those which were in operation prior to 1945. It was found impossible to eliminate them from this survey. The figure of 1400 machines at the end of 1944 is based on a government estimate that 1000 machines were in service at the beginning of World War II, plus approximately 400 which were added during the war years.

Foreign shipment figures that sometimes leaked into the domestic figure in past years have been eliminated, and errors caused by overlapping from year to year have been corrected. The present total is regarded as quite accurate—on the conservative rather than the over-optimistic side.

Obsolescence

No allowance has been made for obsolescence. Practically all machines ever sold are still in operation. Some of them may have changed title four or five times, but they are still molding plastics. Some manufacturers have even built up a sizeable business in furnishing replacement parts. Another reason for lack of obsolescence is that, until the development of pre-plasticizers a year or two ago, there was little change in the basic design of injection machines. As long as a machine held together, the owner had no cause to scrap it in favor of a revolutionary new model. The most revolutionary thing he could do was buy a bigger machine.

There is another important factor that should be considered in any enumeration of machines in the industry. Several molders have built and occasionally still do build their own injection machines. The best guesses obtainable indicate that there may be about 400 such machines currently in operation, but they are not listed in any of this magazine's compilations.

The breakdown by size of injection machines delivered to the domestic market in 1950 is given in Table II. Of these machines, about 70 per cent were for custom or custom-proprietary molders, the balance for proprietary molders only. A noticeable trend in the industry has been the move by more and more custom molders toward the addition of proprietary items to their line.

Foreigners obtained at least 108 injection machines from the United States in 1950 in the 4-oz. or over size. Only two of them were larger than 16 ounces.

Larger Machines

The outstanding feature of the analysis of machine sizes given in Table II is the increasing number of large-size machines. In 1947 only 40 machines were sold of 20-oz. capacity or larger; in 1948 the number was around 55; in 1950, 140.

Of the 1000 machines in existence in 1941, nearly all were 2-, 4-, or 6-oz. capacity. From that time through 1946 the industry added roughly 1700 machines, and of this number it is doubtful that more than 150 were 16-oz. or larger. The big portion were 8-oz.; nearly 1000 of that capacity were delivered in 1946.

These figures are not exact to the last digit due to the difficulty of rejuvenating reports of other years, as mentioned earlier in this article, but they are correct enough to indicate trends. One of the main points of interest, however, is that 1950

THERMOSETTING PRESSES

Because of delay in receiving returns from some manufacturers of compression presses, it was impossible to prepare a survey of compression presses in time for this issue. The figures will be printed in this magazine just as soon as the details can be more completely assembled.

Table I—Estimated Number of Machines in the Thermoplastic Molding and Extrusion Industry[a]

	1944	1949	1950
Injection	1400	3966[a]	4654[b]
Extrusion	....	1987	2205[c]

[a] There are no foreign shipments included in these figures.
[a] This does not include 648 2-oz. or smaller machines shown in Table II.
[b] This does not include 829 2-oz. or smaller machines shown in Table II.
[c] Figure adjusted from previous years' tabulations so that it does not include 1-in. bench extruder nor machines with bore larger than 6 inches. Many of such sizes were included previously. Number of deliveries in 1950 exclusive of 1-in. and over 6-in. sizes was 290.

Table II—Injection Machines Delivered, By Size, Since 1947

Size	2-oz. or less	3-, 4-, 6-oz.	8-, 10-oz.	12-, 16-oz.	20-, 28-oz.	30-oz. and over
1947	74	48	34	103	23	3
1948	182	74	39	81	21	12
1949	302	52	103	113	6	34
1950[a]	181	113	156	229	34	91
Total	829	287	332	526	84	140

[a] 65 machines of 4- to 32-oz. size not included for 1950, due to lack of information on exact size. A similar ratio exists in the other years since it has never been possible to obtain the exact size of every machine shipped.

figure of 91, representing 32-oz. machines or larger, of which more than one third are 60-oz. or bigger.

Estimators of total injection machine capacity have recently come to believe that the industry's capacity can no longer be measured by the rated size of a machine in ounces. A few years ago the standard of measurement was 60 lb. per hour for an 8-oz. machine, but since the advent of pre-plasticizing equipment it has been proved that an 8-oz. machine may consume as much as 100 lb. of material per hour. The exact amount consumed, of course, depends upon the item being molded. Thus, thin walled boxes might be run 20% faster when a pre-plasticizer is used. Without a pre-plasticizer, it would be impossible to heat the material fast enough to flow satisfactorily at this increased speed. On the other hand, if a thick piece is to be molded, the pre-plasticizer does not necessarily speed up production since a slower cycle is needed in order to allow time for the molded piece to cool.

Machine Capacity

Plasticizing capacity has been defined as the number of pounds of material that can be made workable in a given time; injection capacity is the maximum weight that can be produced in one shot. The latter now means little in a machine equipped with a pre-plasticizer.

The big 60- to 200-oz. machines mentioned earlier are examples of the inaccuracy of rating machines in ounces. So-called 60-oz. machines are now being manufactured that can shoot anywhere from 60 to 300 oz. when a pre-plasticizer is employed. The area of the molding is determined more by the size of the platen plus its available clamping pressure than by the so-called capacity of the machine.

Injection machine manufacturers predict that the day is not far distant when a majority of all machines from 8-oz. and up will be equipped with pre-plasticizers—that molders who do not have their present machines so equipped will be unable to compete. They maintain that not only are operations speeded up by this new method, but that pre-plasticization produces a far better product because it results in superior heating of the molding material.

From the above opinions gleaned from the industry it seems obvious that no one can accurately estimate the total capacity of the injection machines now in place. One raw materials producer made a careful survey, counting every machine known to be in operation, and conservatively estimated that total molding capacity for the industry is over one billion pounds a year. And that is without allowance for pre-plasticization. It would seem that the industry is presently far better prepared to take care of its mechanical demands than of its raw material needs.

Extrusion Machines

An accurate estimate of the number of extruders delivered and which are destined for plastics extrusion of finished or semi-finished goods is always difficult because extruders are frequently used for various purposes such as rubber or asbestos extrusion; plastics compounding; and by plastics raw materials companies in their manufacturing processes. Then, too, many machines are used partly for plastics and partly for other materials.

From the figures submitted to this magazine by the various manufacturers, and estimates made by experienced men in the industry, our tabulation shows approximately 290 machines delivered in 1950 that were intended primarily for plastics products. This includes wire coaters, saran monofilament extruders, and machines intended for coating polyethylene on paper. The total figure of 2205 now includes no 1-in. machines and only a small number of large machines sold in previous years that are used for compounding and manufacture of plastics molding materials. It is also predicated on an estimated base figure of 650 extruders at the end of 1944.

The sizes of the approximately 290 machines delivered in 1950 varied from 1¼-in. bore to 6 inches. No 8-in. machines are included, although several were reported, but are assumed to be in use as compounders. There were 13 6-in. machines reported as delivered in 1950 which are intended for use in extruded polyethylene film; for coating polyethylene on paper; and for compounding. There were about 170 machines in the 2- to 3½-in. size; around 40 in the 4½-in. size (a good increase from other years); and the balance were 1¼- and 1½-in. sizes. Over 130 extruders were exported.

The amount of plastics material consumed per hour by an extruder varies considerably according to the job at hand, but, according to reliable estimators, a conservative average for material with a specific gravity of 1 is as follows:

Size of extruder —inches	Plastics consumed per hour—pounds
1¼	10 to 20
1½	15 to 25
2	40 to 50
2½	70 to 80
3¼	100 to 130
4½	200 to 250

WHEN NEEDED...a specialist

Yes—it is often a matter of life and death for a product, too, to operate without a specialist.

That is why Marblette, the organization, has gathered together a brilliant group of specialists in plastics; that is why Marblette, the plant, has slowly built up the special machinery necessary to give you the special formulation in each liquid phenolic resin we produce that matches *your* special production requirements, *your* special market problems.

Marblette's liquid phenolic resins are the thermosetting plastics which can be set either by heat or at room temperature; they are weather-proof, solvent-proof, fungi-proof; resistant to abrasion, heat and temperature.

Let Marblette's 20 years' experience help you in solving your liquid phenolic resin needs—in drums or tank car quantities. Our plant and offices are strategically located to serve you promptly anywhere in the United States. Write "Marblette Engineering" to create for you the special phenolic resin best suited to your special needs.

liquid phenolic resins

Resins for foundry match-plates or patterns	Bonding resins	Wood coating
Heat and acid resistant resins	Low pressure laminating resins	Plastic cements
Bristle setting cement	Laminating varnish	Metal coating
		Insulating varnish

MARBLETTE

37-21 Thirtieth Street • Long Island City, N. Y. • ST 4-8100

CHICAGO • LOS ANGELES • TORONTO • HAVANA

THE YEAR 1950 IN REVIEW

A DEFENSE economy and scarcities of raw materials are again faced by the plastics industry as the conclusion of the first year of the new decade finds the history of the forties being repeated. An analysis of the current situation indicates the likelihood of a cutback in certain consumer products (1).[1]

The bottleneck in further expansion of plastics output, particularly of nylon, phenolic, and styrene resins, is the limited supply of benzene available from coke ovens; this was pointed out nearly four years ago in this magazine and has been reemphasized in several reviews published recently (2–5). Two U.S. plants (Pan American and Shell) late in 1949 started producing synthetic benzene from petroleum at an annual rate of 10 million gallons. It appears likely that these are the forerunners of other such plants which will put the plastics industry in the same independent position with respect to benzene from coal tar that it now enjoys with respect to synthetic versus natural phenol. Hydrogenation of bituminous coal, now under study in pilot plants by the U.S. Bureau of Mines and Union Carbide and Carbon Corp., is another potential contributor to the more than 200 million gallons of benzene that will be needed annually.

Materials

Improvement in established types of plastics by modification of chemical composition or compounding formulation rather than the introduction of new types of resins was the rule during 1950, just as it was during the defense period 10 years earlier. As noted at the Fourth National Plastics Exposition in Chicago (6) and in the Plastiscope throughout the year, these improved materials are to be found in the whole gamut of the industry. The record of this progress will be presented in this review.

Ethylene Polymers—The new polyethylene plants that came into production in 1949 to boost the available capacity for this material to 55 million lb. provide a favorable supply picture for this essential defense material (7). Production of this polymer in this country was started only during World War II to supply a flexible insulating material for electrical equipment operating in the high-frequency field. However, the rapidly growing civilian markets for this newcomer are likely to be pinched somewhat during the coming year.

Versatile polyethylene squeeze bottles have become popular packaging medium

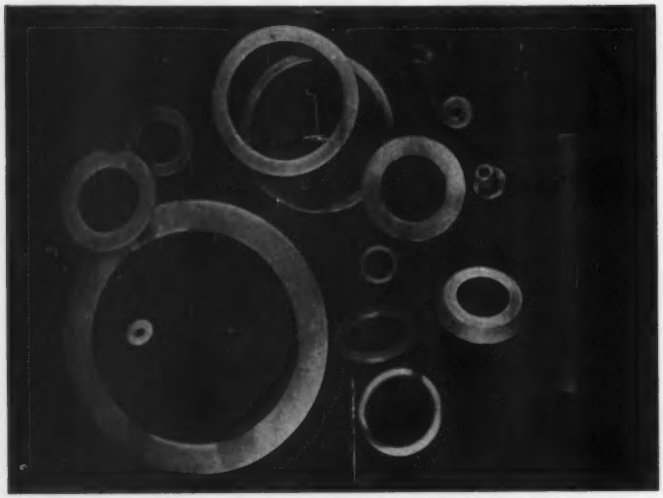
The polyethylene squeeze bottle has been accepted for packaging spray, pharmaceutical, and facial preparations because of its nonbreakability, light weight, and self-dispensing features which offset its higher cost compared to glass (8–11). Liners for steel and fiber shipping containers are being made of extruded polyethylene film, which provides a chemically resistant and inert packaging material, saves on shipping costs, and eliminates cleaning of drums (12–14). The film also is finding many other applications in the packaging (15–19) and chemical (20–22) industries. There has been a rapid expansion in the commercial use of polyethylene as a coating on paper for heavy-duty industrial bags. The coatings are smooth, waterproof, chemically inert, and greatly increase the bursting and tearing strength of the bags (23, 24). Recent initiation of production of extruded polyethylene monofilaments for the textile industry offers promise of opening up other large volume markets for this polymer (25).

This progress in the utilization of polyethylene has been accompanied by increasing attention to improvement in the processing (26, 27) and properties (28–30) of this plastic. The effects of molecular weight (31), inorganic fillers (32), and blends with polyisobutylene (33) on the performance characteristics of polyethylene compositions were analyzed.

Fluorocarbon Polymers—These

* Reg. U.S. Pat. Office

1 Numbers in parentheses link to "References" starting on page 108.



Gaskets molded of polytetrafluoroethylene by a special technique have been found to give much longer service—thus reducing shut-down time and upkeep

World War II products are also of significant interest at this time for electronic and chemical applications requiring inertness, high temperature resistance, and stable electrical properties (34–36). Polytetrafluoroethylene is molded by a special technique resembling that used with powdered metals (37). Gaskets and packings are giving impressively long service under the most difficult chemical conditions, outlasting former materials in ratios as high as 300 to 1 and thereby sharply reducing maintenance labor and shutdown time (38, 39). The resin has become available in the form of suspensoids, which extends its utility into new fields. Coatings applied by dipping or flowing on metals, ceramics, glass, etc., are dried and then heated to fuse the solid particles together. In the form of wrapping tape, molded shapes, and coatings deposited from suspensoid, polytetrafluoroethylene provides non-adherent surfaces for bakery and confectionery machines, drum dryers, heat-sealing devices, and the hoppers, guides, and other components of packaging machines (40).

Polymonochlorotrifluoroethylene can be plasticized with lower molecular weight components and still retain the desirable properties of the high polymer with respect to chemical resistance, flexibility, and toughness. The plasticized compositions can be fabricated at temperatures ranging from 440 to 550° F. (41). Dispersions are available for application to materials and equipment by spray, dip, or brush; each coat of dispersion must be fused at temperatures of 437 to 650° F. for 2 to 5 min., depending on the particular formulation employed. This polymer has been used for extrusion of sheets, tubes from ⅛ to 2 in. in outside diameter, rods from 1/16 to 1½ in. in diameter, and continuous monofilaments for use in fabrics which require the corrosion resistance of this polymer; injection molding of transformer terminals and electronic tube bases; and compression molding of "O" rings, pump diaphragms, valve seats, and multihead terminals (42, 43). The material is not dissolved by any reagent at ordinary temperature. However, certain reagents, notably amines, chloro and chlorofluoro compounds, esters, ethers, and chlorine, are absorbed, and this absorption is increased by elevation of the temperature (44, 45).

Nylon Polymers—The use of this plastic for molding gears, cams, bearings, and other machinery parts where toughness and abrasion resistance are important, is a new development since World War II. The part which it will take in providing such items for military equipment is therefore yet to be determined. The experience and research that has lead to their adoption in business machines, food mixers, speedometers, textile machinery, aircraft rotor transmissions, temperature control equipment, washing machines, and door locks, should provide the basis for obtaining proper design and performance in this new field. In addition to reports on applications of nylon resins (46–49), new information was published on their chemistry (50) and properties (51).

Phenolics—This oldest member of the synthetic resin group is in a position to make important contributions to the defense program, having expanded its production approximately fourfold during the period 1940–1950. Two new applications of phenolic resins offer great promise for further increases in their consumption. One of these is their use as a binder to the extent of 6 to 10% by weight with sand to produce molds for casting metal parts in foundries. The phenolic-sand mold results in improved quality of castings, reduction in manual labor and floor space required, lower cost, and improved working conditions in the foundry (52, 53). The other new market is in resin-sawdust products in which approximately 7% of phenolic resin serves as the binder. Molded panels 4 ft. square are used in the production of doors, drawer bottoms, cabinet ends and backs, and various furniture items (54–56). New developments in phenolic casting resins are of interest for defense tooling and chemical plant equipment (57). Phenolic plastics containing chopped nylon yarn were reported to have good electrical properties and dimensional stability under wet conditions (58). The properties of a variety of phenol-aldehyde resins were described (59, 60).

Polyesters—The potentialities of these resins for use with glass fiber reinforcement in the production of machine housings, boats, lockers, and other parts requiring a high degree of toughness are well known (61–63). They should have many applications in the defense program, particularly where toughness, lightness in weight, and relatively small numbers of fairly large parts are needed. In addition, they may be able to establish themselves in markets opening up as a result of shortages of various metals for civilian items. Mineral-filled compounds made with these resins are used to mold electrical capacitors, resistors, terminal blocks, tube bases

To manufacturers in the plastics industries who require paper-base processing materials with scientifically controlled chemical and physical properties, high quality standards and *dependable uniformity,* MOSINEE is the answer.

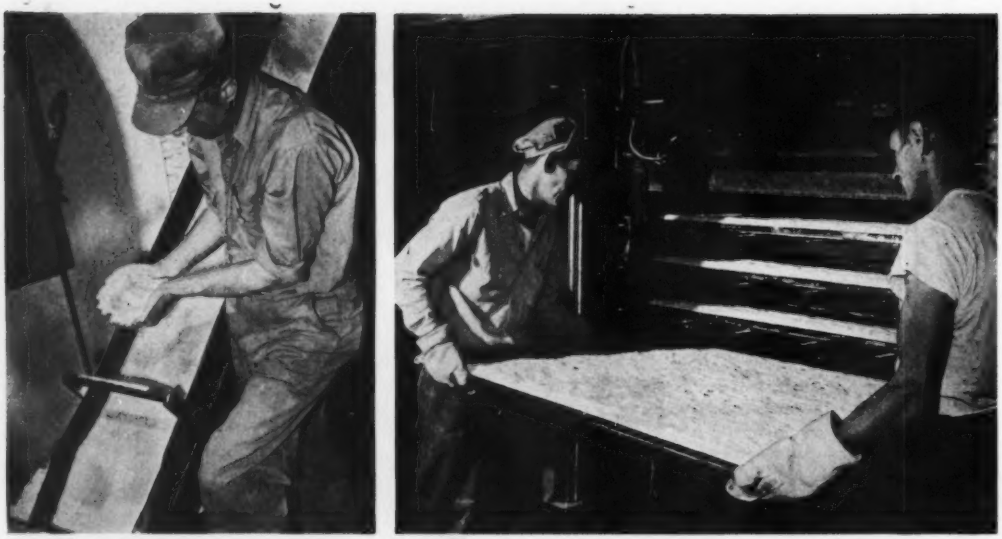
Our technicians and our facilities are at your service. We welcome your inquiry if you have a fabricating or processing problem involving paper. Please write Dept. MP.

MOSINEE

"More than Paper"

MOSINEE PAPER MILLS COMPANY • MOSINEE, WIS.

"Essential Paper Manufacturers"



Products molded of sawdust with a binder of about 7% phenolic resin open new markets to this plastic. Left: Resin-sawdust batch on way to loading unit. Right: Aluminum pans, filled with mixture, are put in loader at press. Five pans are handled in each molding cycle

and sockets, and motor control devices on very fast cycles (64). The polyesters are also useful as insulation for generator coils (66).

Silicone Polymers—The availability of these superior heat-resistant electrical insulating materials marks another advance over our position in the defense program of 10 years ago. Silicone rubber of improved tensile strength and elongation (67–69), glass-fiber-filled molding compound of high strength and heat resistance, and new resins for laminates (70) and coatings (71, 72) are among the recent developments in this field of semiorganic polymers (73).

Styrene Polymers and Copolymers—Now one of the most important members of the thermoplastic group of resins, polystyrene owes its rapid growth during the postwar period to the 400 million-lb. plant capacity for styrene production built during World War II for the synthetic rubber program. Temporarily its further growth is threatened by the needs of the national defense program for styrene in the reopened GR-S plants. However, it is to be expected that polystyrene and more particularly the tough materials prepared from the styrene-butadiene copolymers of high-styrene content (74, 75) will find many significant uses in military equipment.

Recent progress in polystyrene molding materials has been marked by the introduction of lubricants, extension of the color range, and improvement in heat resistance through reduction in monomer and low molecular weight polymer content. The better flow properties and improved molding techniques have made possible such large moldings as the 34-oz. refrigerator hydrator, 59-oz. television lens, and 150-oz. aircraft battery case (76, 77). Two copolymer resins which reinforce natural and synthetic rubber stocks are made by copolymerizing styrene with only enough butadiene to give them compatibility with rubber (78). Evaluation of experimental styrenated alkyds in clear films and in white enamels indicated that they have superior drying time and chemical resistance to conventional phthalic alkyds. It appears certain that styrenated alkyds will play an important role in the surface coating industry from both economic and performance considerations (79, 80). Among the new styrene polymers and copolymers described were formylstyrenes (81), o-acetoxystyrene (82), o-hydroxystyrene (82), and the copolymer of styrene with divinyltetrachlorobenzene (83). Other investigators studied styrene polymerization under various conditions (84, 85).

Vinyl Polymers and Copolymers—These materials served in many significant capacities in military equipment during World War II and are presently available in far greater quantities and types for the new defense program. The development of dispersion resins of this type which could be used in combination with plasticizers and inexpensive thinners was recognized in the 1949 Hyatt award to George M. Powell, III (86). Formulations for plastisols (87) and organosols (88) were published. Dibasic lead phosphite was shown to be a suitable stabilizer for vinyl plastics containing chloroparaffins to impart improved flame resistance (89). Other reports dealt with the properties and applications of rigid polyvinyl chloride products (90), film and sheeting (91–93), molded elastomeric vinyls (94, 95), and plasticizer-free films and coated papers prepared from vinyl latices (96).

Polymers of vinylpyridene (97), vinyl sulfonates (98–100), and vinylidene cyanide (101), and copolymers of vinyl monomers with maleic anhydride (102, 103) and allylidene diacetate (104) were described. Another report contained information on the preparation of polyvinyl acetate and other polyvinyl esters of organic acids (105). Ionic polymerization (106) and intramolecular condensation (107) of some vinyl compounds were investigated.

Cellulosics—Plastics of this type performed many useful jobs during

This month the country's 55,000 big-volume retailers of plastics products will get the first issue of PLASTICS MERCHANDISING.

The new magazine's job — to show these 55,000 buyers how their retail sales can be increased by stocking and promoting more plastics products. In its pages they'll learn what plastics items are available, how they should be sold at the counter, how best displayed, how best advertised.

Each monthly issue will carry this kind of helpful editorial information plus the advertisements of plastics manufacturers interested in finding more customers for the products they make.

Perhaps the 55,000 readers of PLASTICS MERCHANDISING are your best customers and prospects, too. Why not write today for a sample copy and full details.

PLASTICS MERCHANDISING

A Breskin Publication
122 East 42nd Street, New York 17, N. Y.
Affiliated with MODERN PLASTICS

World War II for the Quartermaster, Ordnance, and Chemical Corps. They also served for the production of many civilian items when the supply situation tightened on other types of plastics. It is expected that the demand for acetate, butyrate, nitrate, and ethyl cellulose plastics during the current defense program will lead to a production record in excess of the 133 million-lb. figure established in 1946. New uses for ethyl cellulose (108) and hydroxyethyl cellulose (109) were described in the 1950 literature. Analytical and chemical structure studies were made on cellulose acetate (110–112) and sodium carboxymethyl cellulose (113). The preparation and properties of cellulose phosphates (114, 115) and pyridinium salts of cellulose acetate-chloroacetate (116) were the subjects of reports.

Laminates and Sandwich Materials—In addition to the well established use of fabric and paper base laminates in military electrical equipment, the newer low pressure laminates and sandwich construction materials made with honeycomb or foam cores should find important applications in the defense program. These products combine high strength with ready fabrication and transportability. The growing importance of sandwich materials was emphasized in a series of reports dealing with their testing, evaluation, and use (117–123). The demand for polystyrene foamed plastic in display and packaging items exceeds the present production capacity. Expansion of its markets into the low temperature insulation, sandwich construction, and flotation fields as well as the development of similar outlets for phenolic, vinyl, urea, cellulose acetate, polyurethane, and other plastic foams, are still to come (124, 125). Paper base laminates and honeycomb are finding extensive new uses in building construction (126, 127) and decorative items (128, 129). The properties of laminates made with various fabrics and resins were reported (130–132).

Better flow and improved molding of styrene make large T.V. lenses possible

Courtesy The Dow Chemical Co.

Other Polymers—Acrylonitrile is becoming of increasing significance in the production of polymers, either alone or copolymerized with vinyl chloride or styrene. The most promising outlet at present is in synthetic fibers (orlon and dynel). The synthetic elastomer made with acrylonitrile and butadiene also serves as a plasticizer for polyvinyl chloride (133). Synthesis of methyl methacrylate from isobutylene via methallyl alcohol was reported to give good yields (134). The preparation and properties of various acrylic polymers were described (135–138).

The new epoxy resins, which were discussed in some detail in last year's review, have recorded further advances as bonding, casting, and coating materials (139–141). The electrical properties of polyethylene terephthalate, which is the base of a new type of synthetic fiber (Terylene and Fiber V), were reported (142). Other papers dealt with melamine (143) and aniline (144) resins, phosphonitrile derivatives of phenols and substituted amides (145), acetylenic derivatives of polyesters and polyurethanes (146), and polysulfides (147, 148). Polymerization of styrene (149–153), methyl methacrylate (154, 155), vinyl acetate (156, 157), isopropenyl acetate (158), isobutylene (159), and pinene (160), reaction mechanisms (161–164) and theory (165–167), and techniques and equipment (168, 169) were the subjects of other reports.

Reports on plastics derived from naturally occurring polymeric materials covered casein (170), zein fibers (171), cold-molded bituminous compositions (172), allyl starch (173), rosin esters (174), chlorinated rubber (175), and rubber hydrochloride (176, 177).

Plasticizers and Other Additives—The search for improved plasticizers (178, 179) was continued with investigations of diphosphates (180), dialkyl tetrachlorophthalates (181), lactates (182, 183), and oxaglycol esters (184). Methods for evaluating the effectiveness of plasticizers in reducing the melt viscosity, modulus, and flex temperature in vinylidene chloride copolymers were described (185). Lists of stable colorants for plastic molding compounds (186) and stabilizers for vinyl chloride polymers (187) were published. 7-Hydroxy-4-methyl coumarin was recommended for addition to cellulosics, polystyrene, and melamine plastics to provide protection against deterioration by ultraviolet light (188). Accumulation of electrostatic charges on plastics can be prevented by application of a recently developed coating material (189).

Processing

There was continued activity on all fronts in the development of improved techniques and equipment for molding, casting, fabricating, and finishing plastics. It is difficult to single out any particular advance for special mention, but among the outstanding contributions were those pertaining to slush casting (190, 191), larger moldings in both thermosetting (192) and thermoplastic (193) materials, improved production methods in low pressure laminating (61-63, 194), blow-molding (8) and injection molding (9, 10) of squeeze bottles, and basic investigations of the injection molding process (195, 196). These will be discussed further under the appropriate subheadings to be found in this section.

Compression Molding—Last year mention was made of a 35-lb. one-piece phenolic television console being turned out in a 2000-ton press at the rate of 10 cabinets per hour. The latest practice is to mold two 41-lb. consoles at a time in a 2500-ton press using 2200-tons pressure at the rate of 20 cabinets per hour. This has been made possible by a combination of fast-action presses, high-frequency preheating, and a special long-draw molding compound (192). Other developments in this field included the compression molding of strain-free sheets of thermoplastics 36 in. square and 1 in. thick in multi-platen presses (197) and production of axial plunger pumps for self-contained operation of all types of hydraulic molding presses (198). The relative merits of fully automatic compression molding versus transfer molding for

News about AMERICAN ANODE *materials*

They said it couldn't be done...
So we did it!
1947
WHEN specifications for this high altitude oxygen mask were set up, many "experts" in the use of latices and mixes said flatly that the job couldn't be done with latex. The intricate system of ducts, the metal insert in the nose piece, the rigid tolerances, they claimed, were just too much to expect from a water system.
So . . . American Anode researchers and engineers went ahead and did it—produced the forms, engineered the production, and helped turn out finished masks by the millions.
It's typical of the many "impossible" jobs that we have taken on for our customers and prospects. And we believe that it proves that the possible uses for latices and mixes are practically limitless.
Do you have an idea for a new product that you don't know how to produce? We're not miracle workers, but we believe that we'll come closer to working miracles with latices than anyone else in the country. That's why we offer you the services of our research and technical staff to help you with any product or problem which you may now have.
Latices and compounded mixes of GEON, HYCAR, Saran, neoprene, crude rubber, and GR-S are available. For more information about these modern materials and *methods for using them*, please write Dept. AH-2, American Anode Inc., 60 Cherry Street, Akron, Ohio.
AMERICAN ANODE
INCORPORATED
CRUDE AND AMERICAN RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS

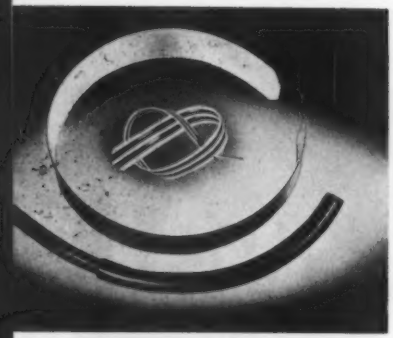
and we're doing even better in 1951!

OUR researchers and engineers did a great job in making it possible to turn out these high-altitude oxygen masks by the millions during the years of World War II.

American Anode researchers are now developing an even more compact high-altitude mask suitable for mass production.

This is another example of how American Anode helps to solve production problems. If you have a problem, or an idea for a product in which the use of latices is indicated, why not write and ask our research and technical staff for help. Please address Dept. AC-1, American Anode Inc., 60 Cherry Street, Akron, Ohio.

CRUDE AND AMERICAN RUBBER LATICES, WATER CEMENTS AND SUSPENSIONS, AMERAN RESIN PASTES



Crosshead extrusion made possible such end products as these two-color strips

various types of molded parts were analyzed (199). Two reviews covered molding equipment and techniques (200, 201).

Injection Molding—The manufacturers of refrigerators, automobiles, television sets, display items, and toilet seats are contributing to a demand for larger injection molded pieces. A recent survey indicated that 60 some plants are now equipped with 32- or 48-oz. presses and that 30 presses of 60- to 80-oz. capacity, two in the 120-oz. range, and one of 200-oz. capacity are on order or in production (193). With such large parts annealing to alleviate stresses becomes increasingly important; methods were described for the detection of stresses and for heating the molded part in an air or water bath or by infra-red radiation to remove them (202). Of even greater significance for the improvement in performance of injection molded parts were basic studies of the injection molding process (195, 196) and the mechanical behavior of hot plastics (203–204). Developments in injection machines (205–206), pin-point gating of molds (207–209), automatic production of two-color parts (210), and molding problems and techniques (211, 212) were discussed by other authors.

Extrusion Molding—Continued emphasis on new designs in extrusion machinery (213, 214) and adoption of modified techniques marked this branch of the industry during 1950. The latter included a process for extrusion of thermoplastics over wood for applications where splintering and scratching present problems (215). Extrusion-blowing of polyethylene squeeze bottles underwent further expansion as this type of container gained acceptance in many packaging markets (8, 216). The extrusion of nylon (217) and of thermosetting materials (218) and special problems in extrusion molding (219–221) were taken up by various authors.

Slush Molding and Casting—Procedures for slush molding of dolls, display pieces, statuettes, lamp bases, and the like from cellulose acetate solutions (190) and vinyl plastisols (191) were described. Low mold costs and simple equipment adapt this type of molding for the production of models and test parts for market analysis. Casting materials for preservation of specimens (222–224), potting of electrical components (225), and industrial tooling (57) were also discussed.

Laminating and Calendering—The low pressure laminating division of the industry recorded promising advances in techniques (194, 226), tooling (227), and applications (61-63, 228, 229). Trends in processes and equipment for coating paper and fabric (230, 231) and manufacturing film and sheeting (232-234) were reviewed. These calendering operations used approximately 175 million lb. of vinyl plastics during 1949 and ran this up to about 250 million lb. in 1950.

Fabricating and Finishing—Hot gas welding of thermoplastic sheets, rods, and tubes has become an important technique for the fabrication of corrosion-resistant equipment for chemical plants, food processors, breweries, laundries, and related industries (235, 236). Unusual and individual designs are embossed on vinyl sheeting by rolls which apply a pattern of lines that pick up and reflect light at different angles to give the appearance of depth and shading (237). A dry colorant blending process permits the molder to obtain a variety of bright colors with simple tumbling equipment at low cost (238). Procedures and dyes for surface coloring of plastic products were reported (239). A plant layout for high vacuum metallizing of plastics was described; production experience has shown this method to be more advantageous than silver reduction or electroplating (240). Improved finishing techniques included multi-hole drilling with standard equipment (241), removal of flash from nylon parts by tumbling (242) and from thermosetting parts by a combination of tumbling and air-blasting with crushed apricot pits (243, 244), and solvent-cleaning of molded pieces (245).

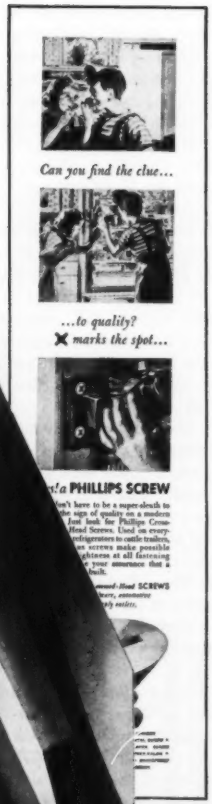
Design, Molds, and Heating Problems—The design (246) and dimensional tolerances (247) of commercial moldings and the standardization of round (248) and cylindrical (249) molds were discussed. Problems involved in fluid (250), radiant (251), and electrical (252) heating of molds and presses and in controlling temperatures (253) were reviewed.

Applications

The year-end outlook was for diversion of an increasing proportion of the supply of plastics to military end uses. Portents of this trend were seen in reports published at intervals during 1950 (1, 254, 255). A review of developments in plastics during 1940–1949, which includes a discussion of the impact of war on the industry and a description of some of the major applications of plastics in military matériel, is very pertinent to this situation (256).

Adhesives—This market now consumes approximately 100 million lb. of synthetic resins annually. Among the applications discussed in recent literature were film and foil laminations for the packaging trade (257), pressure-sensitive tapes (258), and acoustical tile cements (259). The addition of polyisocyanates to rubbers improved adhesion to fabrics, metals, and plastics (260). Investigations of the fundamentals of adhesion (261, 262) and the development of equipment for measuring adhesion (263) and gelation time of urea adhesives (264) contributed to the advancement of the technology of this industry.

Building—Progress was reported in the use of plastic laminates as elements in building construction (265, 266). Acrylic glazing has been installed in additional public and industrial buildings to continue a trend attributable to lower maintenance costs (267). Wall tiles of polystyrene (268) or vinyl-covered insulating board (269) and polystyrene partition blocks (270) are available for interior decorating and construction work. Addition of polyvinyl acetate to concrete mix increases the flexibility of the product and adhesion to the base floor (271). Screening (272), floor mats (273), flexible table-top coverings (274), and drapes and



Does your product have this clue to quality?

Use of Phillips Screws proves extra care in manufacture

Production men know. Design engineers know. Purchasing agents know. AND NOW THE PUBLIC KNOWS that . . .

X marks the spot . . . the mark of *extra* quality. The identifying X formed by the cross-recess on the head of every Phillips Screw.

14 million readers of The Saturday Evening Post are being urged to look for this clue to quality in modern, well-built products.

Phillips Screws make your product stronger, better looking. They eliminate jagged burrs, split screw heads, make production power driving possible. Whether you use Phillips wood screws, machine screws or tapping screws you gain time, money, work-hours.

◀ Current advertisement on Phillips Screws appearing in The Saturday Evening Post.

PHILLIPS *Cross-Recessed-Head* **SCREWS**

X marks the spot... the mark of extra quality

AMERICAN SCREW CO. • THE BLAKE & JOHNSON CO. • CAMCAR SCREW & MFG. CORP.
CENTRAL SCREW CO. • CONTINENTAL SCREW CO. • ELCO TOOL & SCREW CORP.
GREAT LAKES SCREW CORP. • THE H. M. HARPER CO. • NATIONAL LOCK CO. • PARKER-KALON CORP.
PHEOLL MANUFACTURING CO. • ROCKFORD SCREW PRODUCTS CO. • SCOVILL MANUFACTURING CO.
SHAKEPROOF INC. • THE SOUTHINGTON HDWE. MFG. CO. • WALES-BEECH CORP.

THE FASTENERS OF TODAY . . . AND OF THE FUTURE

shades (275) represent other outlets for plastics in the home.

Chemical—Saran pipes are used to carry electroplating and photographic solutions, as intake pipe for seawater, in rayon processing and petroleum cracking plants, and as electrical conduit in highly corrosive atmospheres. Polyethylene pipes are especially suited for food processing and beverage plants, in chlorine-carrying equipment in bleach manufacturing factories, in pharmaceutical plants, and in mines. Cellulose acetate butyrate pipe has been used successfully in rural water systems in soil that causes metal pipe to corrode in two years and in oil wells to drain off salt water from crude oil deposits. Piping made of polyester resin and glass cloth has the highest hydrostatic bursting strength of any known material; developed for use on naval vessels, it is now ready for commercial markets. Development work is also under way with piping extruded of ethylcellulose, styrene copolymers, and other plastics (276).

Vinyl plastic hose in the plant of General Motors of Canada has saved space because its smooth interior finish permits faster delivery of liquids and, therefore, allows use of proportionally smaller hose; its light weight, imperviousness to oil, and wear resistance are also factors in its selection in place of rubber hose (277).

A noteworthy report dealt with the susceptibility of plastics to contamination with radioactive compounds and their subsequent ease of decontamination (278). Special uses of plastics in the plating (279), paper (280), food (281), and leather (282) industries were reported. Several reviews covering the use of plastics as materials of construction for the chemical industry were published (283-286). Specific applications described were a blender (287), applicator brushes (288), and a pail for handling corrosive chemicals (289). Ion exchange resins continued to take on new industrial jobs in such operations as water softening and purification; production of drugs, sugar, and various food products; recovery of metals; and separation of rare earth elements (290-292).

Coatings—The protective coating industry now consumes more than 400 million lb. of synthetic resins annually; this market can be expected to continue to enlarge as the raw material situation improves, and experience in their formulation and application accumulates. Emulsions of thermoplastics and rubbers provide economies in coating operations (293). Electrical insulating varnishes (294), antifouling paints (295, 296), strippable coatings (297, 298), and wrinkle finishes (299) received special attention. New information was published on film-forming bases, including vinyls (300), silicones (71, 72), phenolics (301), petroleum hydrocarbons (302), and reaction products of resins and drying oils (303, 304), and on flameproofing agents (305) and fungicides (306) for incorporation in protective coatings. Testing procedures and properties of organic coatings were recorded in other contributions (307-311).

Courtesy The Landers Corp.

Vast quantities of vinyl were consumed by calendering operations during the past year. Here, a sheet of coated fabric is automatically weighed as it comes off calender to assure even distribution of coating compound. Rollers at lower left are connected by delicate mechanism to weighing scales located over rolls

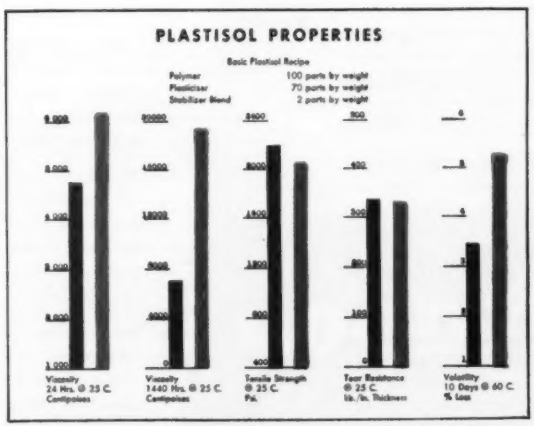
Electrical and Radio—Use of molded phenolic ducts for industrial wiring is a proved means of conserving copper and steel for defense purposes (312). Vinyl, styrene, and ethylene plastics are being used in high-voltage and coaxial cables to provide better performance and lower cost than other insulating materials (313-315). The mushrooming home appliance business (316, 317) is utilizing steadily increasing amounts of plastics in washing machines, vacuum cleaners (318), refrigerators (319-321), air-conditioning units, and kitchen equipment. The radio, television, and phonograph industries employ plastics in the manufacture of cabinets, speakers, control knobs, lenses, and records (322-325). More than 4 million lb. of plastics annually go into housings, handsets, and miscellaneous parts for telephones, of which there are now more than 40 million sets in this country (326). Research on the development of dielectric materials and results of an analysis of their properties were reported (327,328).

Medical—Recent advances in the utilization of plastics in surgery and in medical equipment were reviewed (329-333). These materials have also proved to be useful in the construction of anatomical and skeletal models as visual aids in medical instruction (334, 335). The dental profession is supporting further research on plastic materials and processing techniques which related to their field (336).

Transportation—The amount of plastic used per car in the 5 million automobiles made in 1949 averaged about 14 pounds (337-339). As allocations of metals for defense purposes tighten the supply situation for metals, it is likely that there will be a further increase in the consumption of plastics in the automotive industry. The boat industry has perfected processes for molding boats from glass fabric and polyesters (340-342). One recently marketed cabin cruiser is 24 ft. in length with an 8½-ft. beam; the gasoline and water tanks, ice box, and sink are also molded in place. Painting and caulking are not required for maintenance of these boats. Inflatable row boats made of electronically sealed vinyl film have taken over a market formerly dominated by rubber; portable wading and swimming pools are also made of the same material (343,

HOW TO GET

IMPROVED QUALITY AND LOWER VISCOSITY PLASTISOLS WITH BARRETT* "ELASTEX" 10-P PLASTICIZER


PLASTISOL PROPERTIES
Basic Plastisol Recipe
Polymer 100 parts by weight
Plasticizer 70 parts by weight
Stabilizer Blend 2 parts by weight
Viscosity 24 Hrs. @ 25 C. Centipoises
Viscosity 1440 Hrs. @ 25 C. Centipoises
Tensile Strength @ 25 C. Psi.
Tear Resistance @ 25 C. lbs./in. Thickness
Volatility 10 Days @ 60 C. % Loss

Key: Black—"ELASTEX" 10-P Plasticizer; Red—di-2-ethylhexyl phthalate

In the manufacture of plastisols for coating and low-pressure molding operations, compounders have long known the value of di-2-ethylhexyl phthalate as a primary plasticizer. Dispersions of vinyl resins in this plasticizer possess good storage stability, and are of moderately low viscosity. The coatings and molded articles produced from them exhibit good physical and performance characteristics.

Now Barrett offers the plastisol compounder an even more efficient dispersant—"ELASTEX" 10-P Plasticizer.

Plastisols prepared with this high quality primary plasticizer possess lower viscosity and better storage stability than do those compounded with equivalent amounts of di-2-ethylhexyl phthalate. At the same time, the fused products exhibit improved physical properties, and are subject to less volatile loss.

If you manufacture plastisols for spread coating, molding, or casting, the superior performance of Barrett "ELASTEX" 10-P Plasticizer is well worth investigating.

✓ **NOTE:** Technical advice on the use of BARRETT Chemicals is available to you through the assistance of Barrett representatives. Why not put your problem up to us? Phone, wire or write.

BARRETT* CHEMICALS AVAILABLE TO THE PLASTICS INDUSTRY

"ELASTEX" 10-P Plasticizer	Dibutyl Phthalate
"ELASTEX" 28-P Plasticizer	Phthalic Anhydride
"ELASTEX" 50-B* Plasticizer	Phenol
"ELASTEX" DCHP Plasticizer	Crystal Urea

Barrett*

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
In Canada: The Barrett Company, Ltd.
5551 St. Hubert Street, Montreal, Que.

*Reg. U. S. Pat. Off.

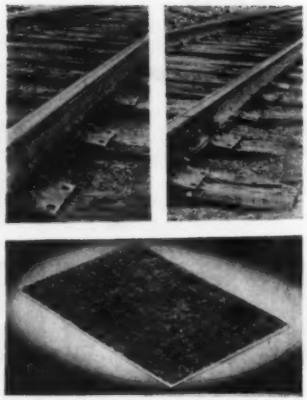
344). Resorcinol adhesives and phenolic-paper laminates are employed in the fabrication of a freight car designed for shipment knocked down for assembly at a distant point, such as at an overseas military base (345). Tie pads made of vinyl resin and abaca fiber are used between wooden ties and steel plates attached to the rails to absorb the shock and destructive abrasion of heavy rail traffic. The manufacturer states that the vinyl pads have reduced tie replacement 30 to 35% and afforded other economies in track maintenance, thus opening up the huge market represented by the more than one billion railway ties installed in this country (346).

Miscellaneous—Natural fibers, rubber, and leather are being replaced in clothing and accessories by plastics (347-350). The percentage of civilian shoes made in this country with synthetic soles was 43.5 in 1949, compared with 26.6 in 1939 and 5.7 in 1926 (351). Significant new uses for plastics have been developed in road building (352), paper making (353), printing (354), cartography (355, 356), preparation of engineering drawings (357), and manufacture of safety motion picture film (358). Other noteworthy applications of plastics described during the year included batteries (359), bristles (360), cameras (361, 362), chairs (363), helmets (364, 365), luggage (366), models (367), navigational aids (368), packaging (369-373), parachute harness (374), signs (375-377), skis (378), sun glasses (379), tableware (380), and upholstery (381, 382).

Properties, Testing, Specifications

The literature of 1950 contains many reports of investigations of the fundamental physical and chemical properties of high polymers. In the field of mechanical properties, these included studies of tensile strength (383-386), creep (387, 388), and dynamic elastic behavior (389-396). The properties of polystyrene (397, 398), polyethylene (399, 400), laminates (401), cap liners (402), and aircraft structural materials (403) were the subject of special reports. Other authors dealt with test procedures and equipment (404-407).

Thermal properties investigated included second-order transitions (408-411), thermal conductivity (412), softening temperatures (413, 414), ignition characteristics (415), thermal stability (416-418), and heats of combustion (419, 420) and polymerization (421). Various optical techniques for evaluating the crystallinity, molecular weight, composition, and other characteristics of plastics were described (422-429). Some outstanding contributions were made to our knowledge of the electrical properties (430-433), chemical resistance (434-436), permeability to gases and liquids (437-443), and permanence properties of plastics under various service conditions (444-449).



Railways use pads of abaca fiber and vinyl resin to protect wooden ties

Analytical methods were reported for cellulose derivatives (450), organic coatings (451), rubbers (452), resins in leather finishes (453), and determination of various groups and components in resins and rubbers (454-458).

Numerous studies were conducted on the effect of type and amount of plasticizer on the properties of polyvinyl chloride plastics (459-464). A significant increase occurred in the literature on the properties of polymer-solvent systems and interpretation of the data thus obtained in terms of molecular structure and mechanical properties (465-477); light-scattering measurements (478-483), viscometry (484-488), and fractionation (489-491) were among the techniques employed in these investigations. The results of pyrolysis studies of various polymers were reviewed (492).

Committee D-20 on Plastics of the American Society for Testing Materials adopted a method of test for luminous reflectance and transmission characteristics and color of plastic materials (D 791-50T) and a recommended practice for injection molding of specimens of thermoplastic materials (D 1130-50T). Specifications for melamine-formaldehyde molding compounds (D 704-50T) and molds for test specimens of plastic materials (D 647-50T) were revised (493). Committee D-14 on Adhesives (494) published a method of test for consistency of adhesives (D 1084-50T) and revised their method of test for resistance of adhesive bonds to chemical reagents (D 896-50T). Reports of specification activities by other groups included specifications for thermoplastic enclosures for electrical appliances, which were prepared by the Society of Plastics Engineers (495), and a review of Federal Specifications (496).

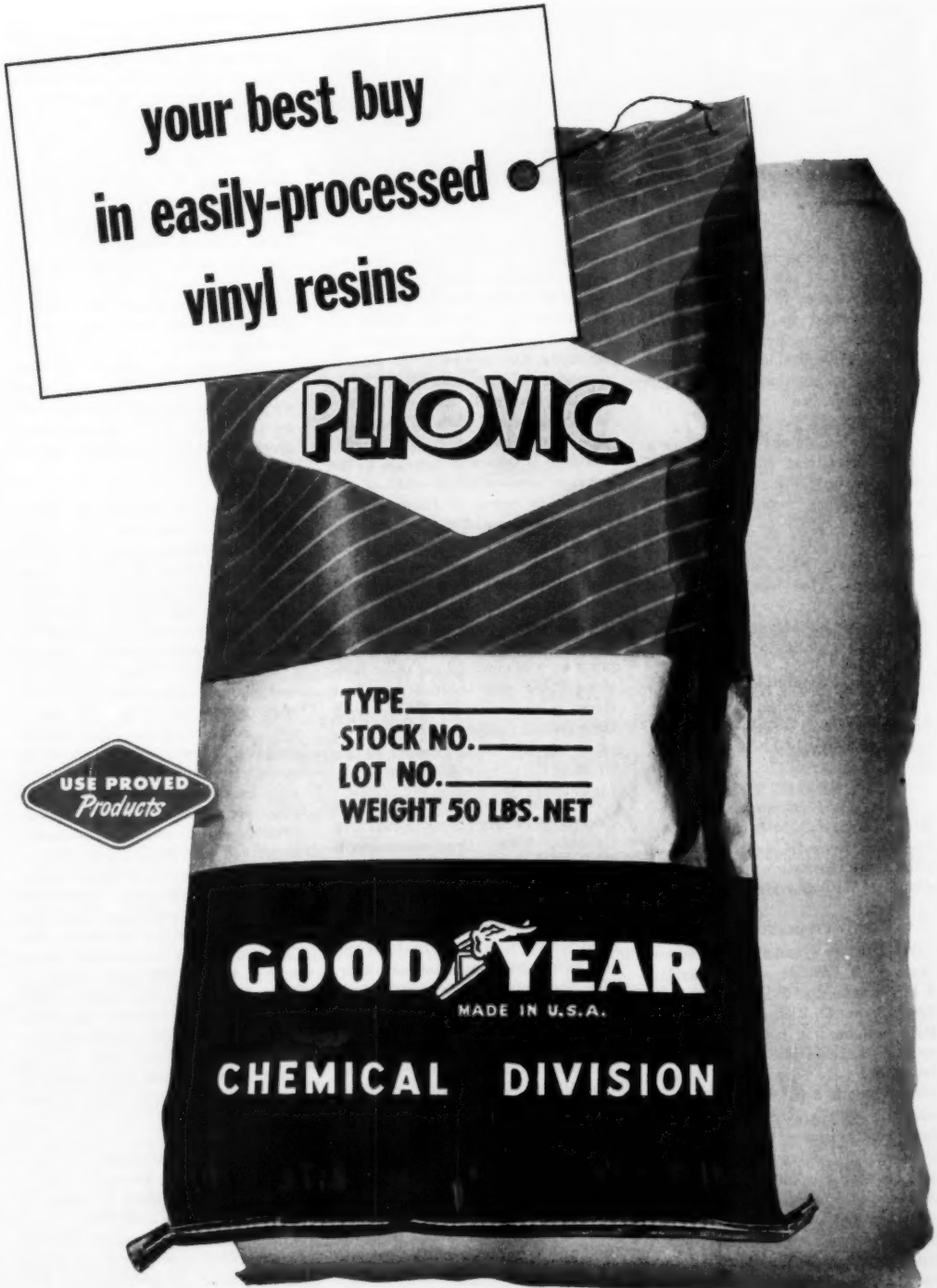
References

1. "Plastics and defense," Modern Plastics *28*, 88A-88D (Sept. 1950).
2. "Benzoi—key to plastics," Modern Plastics *27*, 154, 156, 158 (Aug. 1950).
3. "Benzene," Chem. Eng. News *28*, 3866-3870 (Nov. 6, 1950).
4. "Plastics and organic chemicals," by J. M. Weiss, Chem. Eng. News *28*, 1554-1556 (May 8, 1950).
5. "Resins graze supply ceiling," Chem. Ind. *66*, 499-500 (Apr. 1950).

Materials

6. "At the 4th national plastics exposition," Modern Plastics *27*, 74-76, 146, 148 (June 1950).
7. "Polyethylene progress," Chem. Ind. *57*, 177-178 (Aug. 1950).
8. "The squeeze does it," Modern Plastics *27*, 97-99, 194, 196 (Apr. 1950).
9. "Latest squeeze bottle design," Modern Plastics *27*, 69 (Aug. 1950).
10. "Injection molded squeeze bottles," Modern Plastics *28*, 88 (Sept. 1950).
11. "Squeeze-bottle tests," by A. R. Nielson and J. H. Parliman, Modern Packaging *24*, 141-144 (Sept. 1950).
12. "New deal in drum liners," Modern Plastics *27*, 112, 113 (Apr. 1950).
13. "Bag-in-a-can," Modern Packaging *23*, 151 (Apr. 1950).
14. "Alkathene lay-flat tube," Plastics (London) *14*, 10-11 (Aug. 1949).
15. "'Poly" wrap seen filling many packaging needs," by F. W. Tauber, A. J. Davis, and M. Goldman, Food Ind. *21*, 728-729, 864, 866 (1949).
16. "Polyethylene provides a handy way to murder moths," Modern Packaging *23*, 158 (Apr. 1950).
17. "Moth killer pack," Modern Plastics *28*, 151 (Sept. 1950).
18. "Polythene packaging for export cars," Brit. Plastics *23*, 67 (Aug. 1950).
19. "Improved jar caps," Modern Plastics *27*, 127 (Aug. 1950).
20. "Polythene foil in chemical plant construction," by F. R. Himsworth, Chem. and Ind. *1950*, 555-557 (July 15).
21. "Flame spraying of polyethylene," by J. A. Neumann, Modern Plastics *27*, 85, 86, 88 (June 1950).
22. "Coating with polythene," Brit. Plastics *23*, 56-59 (Aug. 1950).
23. "Polyethylene-coated paper," by L. M. Burgess and L. F. Swec, Modern Packaging *23*, 187-191, 258, 260 (Apr. 1950).
24. "Polyethylene on paper," Modern Plastics *28*, 67, 68, 69, 70, 71. (Dec. 1950).
25. "Polyethylene monofilaments," by W. H. Willert, Modern Plastics *27*, 87-90 (July 1950).
26. "Molding of polythene," by K. J. Persak, India Rubber World *121*, 315-316 (1949).
27. "Sealing of polythene," by W. Ryan, Modern Packaging *23*, 133-137 (Dec. 1949).
28. "Mechanical properties of polyethylene," by R. H. Carey, E. F. Schulz, and G. J. Dienes, Ind. Eng. Chem. *42*, 842-847 (May 1950).
29. "Stress cracking of polyethylene," by R. H. Carey, ASTM Bull. No. 167, 56-60 (July 1950).

(*Continued on* p. 154)



The Goodyear Tire & Rubber Company, Inc., Chemical Division, Akron 16, Ohio

Pliovic—T.M. The Goodyear Tire & Rubber Company, Akron Ohio

PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed.

General

A 1950 GUIDE TO THE PLASTICS. Fortune *41*, 109-18 (May 1950). Properties and uses of 15 types of plastics are presented in a form readily understandable by non-technical readers. This is a noteworthy contribution to popularizing the short names of plastics.

FOURTH ROUND FOR ACRYLONITRILE. Chem. Industries *66*, 345-6 (Mar. 1950). The production of acrylonitrile is discussed from supply and demand viewpoint.

POLYETHYLENE PROGRESS. Chem. Industries *67*, 177-8 (Aug. 1950). Production statistics, new production facilities, and applications of polyethylene are described.

Molding and Fabricating

EXTRUSION-BLOWING BOTTLES. Brit. Plastics *23*, 98-9 (Sept. 1950). The extrusion-blowing of bottles from plastics is described.

NOTES ON EXTRUSION. Z. Rigbi. Brit. Plastics *23*, 100-2 (Sept. 1950). Problems involved in the flow of plastics in extrusion molding are discussed on a rheological basis.

Properties

WEATHERING STUDIES ON POLYETHYLENE. V. T. Wallder, W. J. Clarke, J. B. DeCoste, and J. B. Howard. Ind. Eng. Chem. *42*, 2320-5 (Nov. 1950). Polyethylene has been used for a number of years as a dielectric material, but only recently has it been considered as a mechanical protection for wire and cables intended for direct exposure to the weather. Data are presented on the results of a 10-year program on the effects of weather on polyethylene. An accelerated test, which for the materials tested shows good correlation with natural aging, is described and used to evaluate the aging characteristics of compounds of polyethylene containing carbon black. Data are given showing effects on aging of different types of carbon blacks such as furnace and channel blacks, effects of carbon black concentration on aging, the necessity for efficient dispersion of the carbon black in the polyethylene, and the relation between aging and carbon-black particle size. Age resistance of polyethylene is shown to increase as the average molecular weight of the polymer is increased. These data indicate that channel grades of carbon black which have a particle diameter of about 25 mμ or less when well dispersed in an appropriate polyethylene at concentrations of 1 to 2% can produce compositions having a natural outdoor life expectancy sufficiently long to be considered for most outdoor applications in the wire and cable field. Unprotected polyethylene deteriorates rapidly when exposed to the weather.

EFFECT OF FUNGUS GROWTH ON THE TENSILE STRENGTH OF POLYVINYL CHLORIDE FILMS PLASTICIZED WITH THREE PLASTICIZERS. S. Berk. ASTM Bull. No. 168, 53-5 (Sept. 1950). Polyvinyl chloride films plasticized with three plasticizers were inoculated with a species of Trichoderma and incubated on mineral salts agar. The films plasticized with a mixture of dibutyl sebacate and dioctyl phthalate were very susceptible to mold attack whereas the films plasticized with dioctyl phthalate or butadiene-acrylonitrile were mold inert. Tensile strength tests conducted on the films exposed to mold growth for 6 weeks showed that the formulation with dibutyl sebacate had a 63% increase in tensile strength and a 67% loss in percentage elongation over the unincubated controls. The large increase in tensile strength is attributed to the removal of plasticizer by the fungus. The films with the other two plasticizers had no appreciable changes in tensile strength and percentage elongation. Changes in tensile strength and percentage elongation may be used as a criterion for measuring the degradation of plastics by fungi.

SIZE OF SILICONE MOLECULES. T. G. Rochow and E. G. Rochow. Science *111*, 271-5 (1950). The molecular weights of silicone resins and rubbers were determined from the character of the fractured surfaces. The samples were cooled to liquid nitrogen temperatures and broken. Replicas of the fractured surfaces were examined by an electron microscope and the sizes of the particles measured. The molecular weights, approximately 300,000, calculated from these measurements agree with those obtained by the osmometrical method.

BEHAVIOR OF GRANULATED POLYMERS UNDER PRESSURE. R. S. Spencer, G. D. Gilmore and R. M. Wiley. J. Applied Phys. *21*, 527-31 (June 1950). In such fabricating processes as extrusion and injection molding it is frequently necessary to force a granular polymer through a channel. Frictional forces between polymer and channel walls lead to a drop in pressure through the granular material. Simultaneously, the applied pressure causes a compaction of the granules. Assuming that the granular mass has certain fluid-like properties, a simple theoretical expression for pressure transmisssion is derived. Comparison with data on saran powders and granular polystyrenes shows good agreement between theory and experiment. The effect of lubrication is shown also. The compaction of granular polystyrene follows the same pattern as that observed in the earth's crust. The porosity decreases exponentially with increasing pressure. The "compressibility coefficient" for the porosity of granular polystyrene is comparable with that given for clays and shales.

MECHANICAL PROPERTIES OF ORIENTED POLYSTYRENE FILM. L. E. Nielsen and R. Buchdahl. J. Applied Phys. *21*, 488-93 (June 1950). Cast films of polystyrene were oriented by stretching at temperatures above the softening temperature of the material and then cooling. A factorially designed experiment was car-

* Reg. U.S. Pat. Office

LAMINATING PROBLEMS?

LOOK TO RCI FOR THE ANSWERS!

What's your bonding or laminating problem — better treating machine yields . . . lower stack losses . . . greater water resistance . . . faster curing . . . better electrical and mechanical properties? Scores of firms have found RCI Plyophens the answer in hundreds of different applications. Send for RCI's Plyophen catalogue and see for yourself how the versatile Plyophen line can meet your needs.

No. 266—A synthetic-cresol-base varnish producing laminates with excellent dielectric and water-resistant properties. Especially recommended for NEMA materials (XX and XXX).

No. 268—Another synthetic-cresol-base varnish combining outstanding dielectric qualities with good hot-punching properties. Usual XXP treatment with this resin results in laminates which will meet NEMA specifications for XXXP materials.

No. 324—The penetrating and flowing properties of this alcohol-soluble phenolic resin especially fit it for the manufacture of filler sheets for decorative laminates. Meets NEMA specifications, cuts treating machine time, affords phenomenal treating machine yields, and possesses excellent storage stability.

No. 328—A water-soluble phenolic resin developed to meet the needs of insulation manufacturers for a low cost rock wool binder. A highly uniform product with a proved ability to reduce stack losses.

No. 5010—A fast-curing phenol varnish for laminated paper or canvas sheet stock, tubing, bearing materials. Excellent mechanical strength.

No. 5012—A quick-curing, all-around phenol varnish for paper or canvas. Can be substituted for cresol-type materials. Good mechanical and electrical properties.

No. 5013—This phenol varnish produces paper laminates with 35,000 to 40,000 lbs. tensile strength at 150 to 250 psi. It is also in demand for paper face sheeting and bag molding, and in the manufacture of plastic-faced plywood.

No. 5030—A cresol-base laminating varnish for applications requiring the best electrical and mechanical properties. Meets specifications for all NEMA grades except punching stock.

No. 5031—A cresol-base laminating varnish especially developed for the manufacture of hot-punching stock. Produces paper laminates featuring dielectric strength and low power factor.

No. 5033—A cresol-base varnish for use in the manufacture of laminated cold-punching stock.

No. 5036—A cresol-base laminating varnish for manufacturing hot-punching stock meeting NEMA specifications for XXP and XXXP grade materials.

No. 5040—A phenol-base varnish producing laminates equal to those made with cresol-type resins, both mechanically and dielectrically, with same production techniques.

REICHHOLD CHEMICALS, INC.

General Offices and Main Plant, Detroit 20, Michigan

Other Plants: Brooklyn, New York • Elizabeth, New Jersey • South San Francisco and Azusa, California • Tuscaloosa, Alabama • Seattle, Washington Chicago, Illinois • Liverpool, England • Paris, France • Sydney, Australia • Sassenheim, Holland • Naples, Italy • Buenos Aires, Argentina Hamburg, Germany • Toronto, Canada • East London, South Africa • Osaka, Japan

SYNTHETIC RESINS • CHEMICAL COLORS • PHENOLIC PLASTICS • INDUSTRIAL CHEMICALS

have you discovered FORMICA laminated plastics?

It's the toughest, strongest, most durable material you can buy in its weight class.

It's half the weight of aluminum.

Its strength-weight ratio compares favorably with steel.

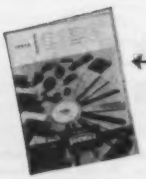
Meets or exceeds the standards set by N. E. M. A.

Productive Formica comes in sheets, tubes, rods,

and special postformed and molded forms. It can be punched, turned, milled, drilled, threaded and stamped on machinery already in your metalworking or woodworking shop.

Productive Formica is noted for increasing sales volume and for lowering manufacturing costs.

It can do as well for you . . . because it's a versatile material of many uses . . . excellent for electrical, chemical or mechanical applications. Why not see for yourself . . .



Send today for your free 16-page illustrated catalog.

THE FORMICA CO.
4531 SPRING GROVE AVENUE
CINCINNATI 32, OHIO

Productive FORMICA at Work in Industry

ried out in which the amount of stretching, temperature of stretching, time held in the stretched state before cooling, and effect of several cycles of stretching before cooling were investigated as they affect the birefringence, the stress-strain properties, dynamic modulus and damping, and the softening temperature of polystyrene. The values of many of the mechanical properties are more closely related to the birefringence than to the amount of hot stretching. In general, the value of the stress-strain properties in the direction of hot stretch, the dynamic modulus, and the birefringence all increase with an increase in the amount of stretching, a decrease in temperature, an increase in rate of cooling after stretching, and a decrease in the number of times the film was stretched before finally cooling. The softening temperature is decreased in direct proportion to the birefringence. Annealed films give higher softening temperatures than films which have been stretched and then allowed to shrink before cooling.

Testing

ANALYSIS OF SODIUM CARBOXYMETHYLCELLULOSE. A. Z. Conner and R. W. Eyler, Anal. Chem. 22, 1129-32 (Sept. 1950). A method was developed for determining the assay value and degree of substitution of sodium carboxymethylcellulose. The copper salt of carboxymethylcellulose is precipitated, weighed, and analyzed for copper content iodometrically. From the weight of the precipitate and the copper content, the sodium carboxymethylcellulose content and the degree of substitution may be readily calculated. The method is primarily applicable to purified grades of sodium carboxymethylcellulose over the commonly encountered ranges of viscosity and degree of substitution (0.6 to 1.2). The salt impurities most frequently present, with the exception of the phosphates, do not interfere. The method was applied to a number of purified-grade commercial samples with an average recovery of 98% or better, and with a degree of substitution accuracy of within 0.03 unit.

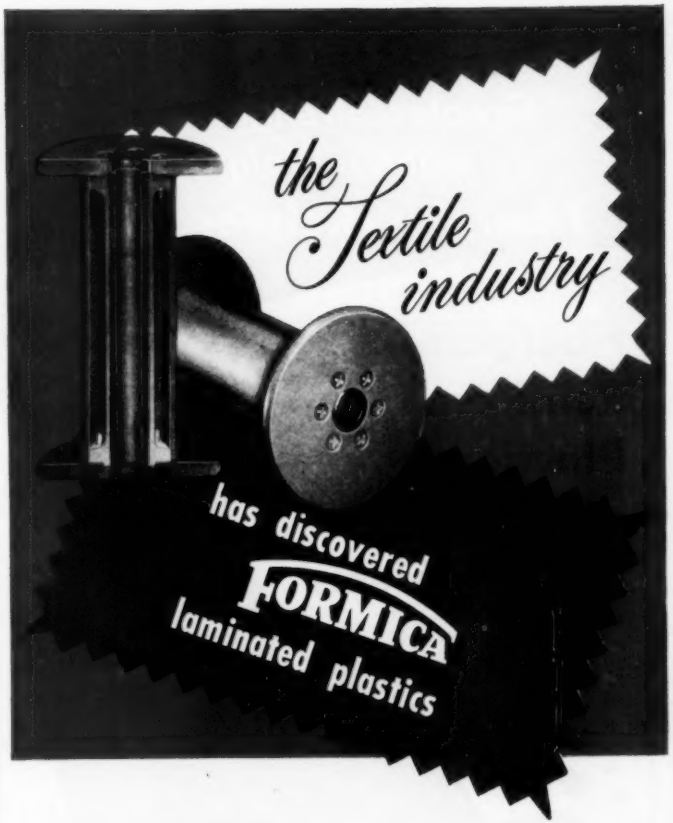
LABORATORY TESTING OF THE RAIN EROSION RESISTANCE OF AIRCRAFT FINISHES. J. K. Grace and G. C. Frey. ASTM Bull. No. 168, 56-66 (Sept.

1950). Erosion has occurred on the surfaces of several modern airplanes during flight through rain. The eroded areas have been principally the surfaces of low-pressure, glass cloth, polyester laminates, and organic finishing materials. Test equipment has been principally of two types: water-jet testers and whirling-arm testers. The water-jet testers operate by impinging a high-velocity jet of water on a specimen. The jet is usually modulated or interrupted in some manner. The whirling-arm testers move the specimen, at high speed, through a water spray simulating rain. Erosion somewhat similar in appearance to that obtained in service is obtained with both types of testers. Data from a jet-type tester are compared with previously reported data from a whirling-arm tester. Both sets of data indicate that the time required for erosion failure of several plastic materials varies as the reciprocal of a large power of the velocity. The specific relation, however, differs greatly for the two testers, the velocity exponent being approximately 18 for the jet tester and 7 for the whirling arm tester. Certain plastic laminate configurations and certain organic finishes show markedly better rain erosion resistance in tests than do conventional materials.

Materials

HYDROXYETHYLCELLULOSE AND ITS USES. W. E. Gloor, B. H. Mahlman, and R. D. Ullrich. Ind. Eng. Chem. *42*, 2150-3 (Oct. 1950). A newly introduced variety of alkali-soluble hydroxyethylcellulose is described. Its solubility, resistance to precipitation, and compatibility properties are tabulated. Data are presented on its physical characteristics. A description is given of suggested end uses in the fields of filament, sheet, textile and paper finishing, and ink. Recent work indicates the utility of the material in mineral flotation and in improvement of flocs obtained in water treatments. 63 references.

POLYSULFIDE POLYMERS. E. M. Fettes and J. S. Jorczak. Ind. Eng. Chem. *42*, 2217-23 (Nov. 1950). The chemistry of polysulfide condensation polymerization is reviewed briefly. The structures of the polymeric products as well as the effects of copolymerization, cross-linking, end groups, and molecular weight upon polymer



The Gyrotex Bobbin (above) is a product of Formica's unique facilities for serving industry. It was produced at the request of a leading textile mill for a bobbin that (1) could resist the enormous pressure exerted by Nylon and Orlon yarns, (2) could be removed and replaced safely on whirling spindles and (3) would be smooth, snag-proof. The Gyrotex Bobbin was designed, engineered and produced entirely by Formica.

Formica's many other useful characteristics have been recognized and employed by the textile industry: It's half the weight of aluminum . . . has great strength . . . and won't support vibration. It's excellent for chemical, mechanical or electrical applications. Formica is used for almost a hundred different textile machinery parts — eloquent testimony to its usefulness, versatility and reliability.

You'll find it profitable to discover Formica, too. It'll work wonders in your product or manufacturing processes. Our engineers will be glad to work with your engineers for the most practical solution to your problem. The Formica Co., 4531 Spring Grove Ave., Cincinnati 32, Ohio.

Send for colorful new catalog on Formica sheets, tubes and rods . . . and postformed, molded and fabricated parts.

Productive
FORMICA
at Work in Industry

Larger Molds . . .
Greater Strength . . .
Lighter Weight with . . .
Fiberglas-Reinforced Plastics

Fiberglas-Reinforced Plastic may solve your problems

Above illustrations are examples where fiberglas-reinforced plastic solved problems.

1. Beverage cooler lid and panel. Dry Coolers require a deep lid to hold insulation plus exceptional contour to fit into the rubber gaskets and seal in the dry cold. Fiberglas-reinforced plastic solved the problem.

2. Poultry dropping pan of fiberglas-reinforced plastic eliminated corrosion and denting, simplified cleaning, and lasted several times longer.

3. Fiberglas-reinforced plastic is proving superior for refrigerator applications. (a) Strike connector made from flat sheet has two self-tapping holes and two counter-sunk holes.

(b) Strike plate of fiberglas-reinforced plastic eliminates transfer of heat from food liner to outer shell and cuts out previous assembly requiring three separate pieces and four rivets. Center is built up to .340" and the ears to .187". Serrations ground into top surface mount the strike.

(c) Shell gussets give structural strength needed between the food liner and outer frame of refrigerator yet are not conductors of heat. Need for less insulation allows larger food liner with the same size outer shell.

Use fiberglas-reinforced plastic for better, stronger, simpler, lower cost products.

NEW YORK OFFICE: 292 Madison Ave.

MOLDED RESIN FIBER CO.
ASHTABULA, OHIO
World's Largest Producer of Fiberglas-Reinforced Plastics

properties are discussed. The composition and properties of the commercial crude rubbers, water dispersions, and liquid polymers are presented together with ideas on the mechanism of their vulcanization. The reason for the odor of polysulfide polymers is discussed. Some information is presented on solvent resistance, stress relaxation, and other characteristics of the polymers. Applications for the various products are summarized. 69 references.

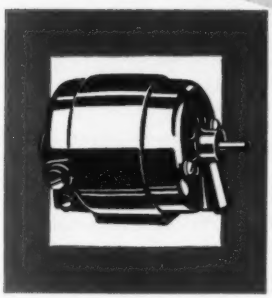
THE FLUOROCARBONS. J. H. Simons. Chem. Eng. 57, 129-36 (July 1950). The synthesis, properties, and possible applications of fluorocarbons are described.

Applications

EVALUATION OF ADHESIVES FOR ACOUSTICAL TILE. F. W. Reinhart, B. D. Loos, and N. J. DeLollis. ASTM Bull. No. 169, 57-62 (Oct. 1950). The properties of commercial adhesives used for bonding acoustical tile to walls and ceilings of rooms were evaluated to obtain data to serve as a basis for the preparation of a specification for these materials.

RESIN BONDING OF HARDWOOD FIBERS IN OFFSET PAPERS. B. W. Scribner, M. B. Shaw, M. J. O'Leary, and J. K. Missimer. J. Research Nat. Bureau Standards 45, 208-17 (Sept. 1950). An investigation was made of the application of resin bonding to the development of strength in offset papers made principally of short hardwood fibers that develop little strength by the conventional beating. The papers were made from aspen, black gum, paper birch, and beech. The pulps were prepared by the mechanical, sulfate, soda, sulfite, and neutral sulfite processes. By the use of melamine resin, papers having good strength and resistance to pick, combined with low expansion and curl, were produced with very little beating. The pulps that gave the best results comprised aspen sulfate, aspen soda, aspen sulfite, birch sulfite, and black gum sulfate. Resin-bonded papers containing 75% of these pulps compared favorably with papers made in the conventional way with the usual 50% of commercial hardwood fibers. An appreciable increase in the proportion of hardwood fibers used in offset papers would greatly extend pulpwood resources.

Little parts
TELL A BIG STORY



. . . about low-cost plastic inserts custom molded by GENERAL INDUSTRIES

These small parts—brush holders, screw caps and commutators for fractional horsepower motors—have been produced in quantity by The General Industries Company since 1924. In each part, plastic and metal are combined efficiently and economically to meet the specific requirements of the application.

With modern tools for machining of metal inserts, and advanced techniques for molding these inserts in plastic materials, General Industries offers prompt delivery of such parts at lowest possible unit cost.

Other custom molded parts currently being produced by General Industries range from small control knobs to large intricate cabinets and housings. General Industries' extensive production facilities include a complete range of presses for all types of compression, transfer and injection molding processes.

Backed by more than 40 years of experience in the development and advancement of molded plastics, General Industries' engineers gladly will assist you in any problem involving these versatile materials. Write *today* to:

The GENERAL INDUSTRIES Co.

DEPARTMENT R • ELYRIA, OHIO

U. S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

MOLDING. E. R. Knowles (to Improved Paper Machinery). U. S. 2,519,255, Aug. 15. Injection molding press.

MOLDING. G. W. Jargstorff and C. A. Joslin (to Union Carbide). U. S. 2,519,375, Aug. 22. Method and apparatus for molding thermoplastic tubing.

ETHYLENE POLYMERIZATION. M. J. Roedel (to Du Pont). U. S. 2,519,791, Aug. 22. Polymerizing ethylene under pressure at 60 to 400°C. in the presence of di(*tert*-butyl) peroxide.

EXTRUSION. A. W. Hanson, A. L. Heston and H. E. Buecken (to Dow and National Rubber Machinery). U. S. 2,519,834, Aug. 22. Apparatus for mixing, milling, and extruding plastic material.

FLUOROSILANES. B. A. Bluestein (to G.E.). U. S. 2,519,879, Aug. 22. Method for preparing alkyl-fluorosilanes.

POLYSILOXANES. S. D. Brewer (to G. E.). U. S. 2,519,881, Aug. 22. Polysiloxanes.

COPOLYMERS. E. C. Chapin and G. E. Ham (to Monsanto) U. S. 2,520,083, Aug. 22. A blend of acrylonitrile-vinyl acetate-butyl acrylate copolymer with vinyl acetate-butyl acrylate copolymer.

COPOLYMERS. G. E. Ham (to Monsanto). U. S. 2,520,086, Aug. 22. A blend of a copolymer of methyl methacrylate and vinyl acetate and a copolymer of butyl acrylate and vinyl acetate.

COMPOSITION. E. L. Kropa and W. M. Thomas (to American Cyanamid). U. S. 2,520,150, Aug. 29. Composition comprising a polyacrylonitrile - 5 - chloromethyl - 2 - oxo - oxazolidine.

FILMS. P. F. Sanders (to Du Pont). U. S. 2,520,173, Aug. 29. Process for preparing unsupported films of tetrafluoroethylene polymers.

EXTRUSION. J. E. Roberts (to R. C. Parkes). U. S. 2,520,337, Aug. 29. An extruding machine.

POLYMERIZATION. J. A. Robertson (to Du Pont). U. S. 2,520,339, Aug. 29. Araliphatic azo catalysts for polymerization of ethylenic materials.

CONDENSATES. J. J. Carnes (to American Cyanamid). U. S. 2,520,381, Aug. 29. Condensation of ethylene oxide with carboxylic acid amides.

POLYMERIZATION. M. M. Lee. U. S. 2,520,601, Aug. 29. Promoters for polymerization of unsaturated polyester-polystyrene resin copolymerizates comprising a peroxide and a phosphine in combination.

COPOLYMERS. W. H. Charch (to Du Pont). U. S. 2,520,711, Aug. 29. Vulcanizate of a compatible mixture of a copolymer of butadiene-dimethyl 2-vinylethynyl carbinol and butadiene dimethyl iso-propenyl ethynyl carbinol copolymer and a crotyl cellulose.

POLYMERS. R. C. Morris and A. V. Snyder (to Shell). U. S. 2,520,733, Aug. 29. Polymers of tri-methylene glycol.

PHENOLIC RESINS. T. F. Clark (to U. S.). U. S. 2,520,913, Sept. 5. Mixing phenolic resin with lignin concentrate, hexamethylenetetramine, and calcium hydroxide and compounding by milling.

POLYMERS. J. B. Dickey and T. E. Stanin (to Eastman). U. S. 2,520,917, Sept. 5. Polymers of carboxyamido- and sulfanamido-styrene with vinylidine compounds to produce material suitable for use in textile fibers.

POLYMERIZATION. J. R. Powers (to Goodrich). U. S. 2,520,959, Sept. 5. Process for preparing vinyl polymer latices.

HYDROCARBON RESINS. C. S. Rowland (to Interchemical). U. S. 2,521,022, Sept. 5. Thermoplastic resin obtained by polymerizing unsaturated components of heat dimerized hydrocarbons in the presence of boron trifluoride.

INTERPOLYMERS. A. W. Meyer (to U. S. Rubber). U. S. 2,521,078, Sept. 5. Coating comprising an interpolymer of a styrene, diallylic fumarate, and allyl alcohol mixed with similar copolymers.

TESTING DEVICE. H. W. Dietert and R. L. Doelman (to Harry W. Dietert Co.). U. S. 2,521,206, Sept. 5. Apparatus for mechanically testing specimens of molding materials while being heated.

PLASTICS PRESS. R. E. Butler. U. S. 2,521,282, Sept. 5. An electrically heated plastics press.

ION EXCHANGE RESINS. W. L. Evers (to Rohm & Haas). U. S. 2,521,288, Sept. 5. Spheroidal ion exchange resins prepared by dispersing condensates of methylol-forming phenol, formaldehyde, and an alkylene polyamine in a dispersing liquid in a non-solvent and curing.

COPOLYMERS. H. T. Neher, E. H. Kroeker, and W. J. Croxall (to Rohm & Haas). U. S. 2,521,303, Sept. 5. Copolymers of allyl succinyl allyl glycolate and acrylic or methacrylic acid.

CYCLOPENTADIENE. J. D. Garber (to Standard Oil). U. S. 2,521,359, Sept. 5. Copolymers of cyclopentadiene and a monoolefin in the presence of a Friedel-Crafts catalyst.

COPOLYMERS. A. M. Gessler (to Standard Oil). U. S. 2,521,361, Sept. 5. Plasticized copolymers of a diolefin and acrylonitrile or methacrylonitrile.

SHEET MATERIAL. C. E. Maynard and L. H. Gustafson (to Design Center and Pro-Phy-Lac-Tic Brush). U. S. 2,521,387-8, Sept. 5. Machine for making articles such as display covers from thin plastic sheet material.

POLYMERIZATION. H. D. Hartough and S. L. Meisel (to Socony-Vacuum). U. S. 2,521,514, Sept. 5. Phosphoric acid polymerization of thiophene compounds.

SILOXANE COPOLYMERS. J. Marsden (to G. E.). U. S. 2,521,528, Sept. 5. Elastic hydrocarbon-substituted polysiloxanes prepared in the pres-

PLASTICS

You're always right with

AUTO-LITE

• New beauty and economy have been made possible through the use of plastics and metal and plastic combinations as produced by Auto-Lite. The artistic skill and forward thinking of Auto-Lite's Art and Style Division is available on matters of design. Inquiries are invited.

FUNCTIONAL PLASTICS

Plug-in terminal with intricate metal inserts.

. . .

Circuit breaker switch box. All plastic.

. . .

Elastomeric nipples, resistant to breakage, dust, dirt and oil.

THE ELECTRIC AUTO-LITE COMPANY
Bay Manufacturing Division
723 New Center Building, Detroit 2, Michigan — Bay City, Michigan

Tune in "Suspense" . . . CBS Radio Thursdays . . . CBS Television Tuesdays

ence of tertiary butyl perbenzoate catalyst.

LIGNIN RESINS. H. A. Mitman and R. N. Evans (to Masonite). U. S. 2,521,532, Sept. 5. Heating lignin, furfuryl alcohol, and formaldehyde in the presence of a catalyst.

COPOLYMERS. C. F. Fisk (to U. S. Rubber). U. S. 2,521,575, Sept. 5. Copolymers of maleic alkyds with monovinyl compounds.

PURIFICATION MATERIALS. J. R. Dudley (to American Cyanamid). U. S. 2,521,664, Sept. 5. A fluid purification material consisting of granular condensate of an alkylene polyamine-formaldehyde interpolymerized with an aminotriazine-formaldehyde condensate.

ORGANO-SILOXANES. L. F. Berhenke and L. W. Byers (to Dow). U. S. 2,521,672, Sept. 12. Curing organosiloxanes in admixture with a paint drier by heating.

POLYMERS. E. C. Britton and L. F. Berhenke (to Dow). U. S. 2,521,673-4, Sept. 12. Treating organo-siloxane resins in inert solvent with an alkali metal hydroxide.

INTERPOLYMERS. H. M. Hoogsteen (to Dow). U. S. 2,521,675, Sept. 12. Interpolymerization of styrene, alpha-methylstyrene, and oxidized soybean oil.

ORGANO-SILOXANE RESINS. H. C. White and E. C. Britton (to Dow). U. S. 2,521,678, Sept. 12. Method of preparing organo-polysiloxane resins.

POLYMERIZATION. T. Shusman (to Monsanto). U. S. 2,521,754, Sept. 12. Polymerization of a vinyl aromatic compound in the presence of a di-*tert*-butyl peroxide and *tert*-butyl perbenzoate.

INTERPOLYMERS. J. R. Caldwell (to Eastman). U. S. 2,521,898, Sept. 12. Resinous interpolymer of isobutenyl acetate and acrylonitrile.

POLYMERS. H. W. Coover, Jr. and J. B. Dickey (to Eastman). U. S. 2,521,902, Sept. 12. Polymers of N-fluoroalkylacrylamides.

RESINS. S. O. Greenlee (to Devoe & Raynolds). U. S. 2,521,911-2, Sept. 12. Phenol-aldehyde and epoxide resin compounds.

RESINS. H. J. Hegemeyer, Jr. (to Eastman). U. S. 2,521,914, Sept. 12. Resinous copolymers comprising acetylated products obtained from the enol form of keto-esters and an unsaturated nitrile.

POLYVINYL ETHERS. C. E. Schildknecht (to General Aniline). U. S. 2,521,950, Sept. 12. Stabilizing polyvinyl alkyl ethers with p-hydroxy-N-phenylmorpholine and alkali.

MOLDING. G. B. Sayre (to Boonton Molding). U. S. 2,522,134, Sept. 12. Automatic control for inverted transfer molding presses.

ADHESIVES. J. R. Schaffer (to Goodrich). U. S. 2,522,135-6-7-8, Sept. 12. Adhesives for bonding rubber to metal and natural rubber to synthetic rubbers, comprising chlorinated rubber and hypochlorinated rubber.

POLYMERS. A. G. Chenicek (to Interchemical). U. S. 2,522,254, Sept. 12. Solutions of polymers of crotyl, methallyl, and allyl polyesters of polybasic organic acids containing cerium salts, and process for preparing durable films therefrom.

WOOL TREATMENT. E. N. Angus, J. W. Creely, and R. M. Fischer (to American Cyanamid). U. S. 2,522,-338, Sept. 12. A method for shrinkproofing wool with an uncured thermosetting resin.

CHALKBOARD. C. B. Egolf (to Rohm & Haas). U. S. 2,522,351, Sept. 12. Chalkboard comprising a sheet of rigid polymeric plastic having a matte surface and having dispersed therein hard abrasive material.

THIOPHENE PRODUCTS. C. F. Feasley (to Socony-Vacuum). U. S. 2,522,-355, Sept. 12. Preparing thiophene-aldehyde condensates in the presence of solid adsorbent.

POLYMER MIXTURE. G. E. Ham (to Monsanto). U. S. 2,522,445, Sept. 12. A homogeneous miscible mixture of alpha-cyanoacetamide polymer and a polymer containing acrylonitrile.

VINYL POLYMERS. L. A. Brooks, M. Markarian, and M. Nazzewski (to Sprague Electric). U. S. 2,522,501, Sept. 19. Composition comprising a polymer of a diaryl ether, an aryl group of which is substituted with a vinyl radical.

ION EXCHANGE. H. M. Day and R. L. De Hoff (to American Cyanamid). U. S. 2,522,569, Sept. 19. Cation-exchange resin comprising reaction products of 4,4'-diphenylol dimethylmethane and formaldehyde in the presence of a sulfiting agent.

ALKYD RESINS. R. P. Silver (to Hercules). U. S. 2,522,586, Sept. 19. Alkyd resins prepared from tricarboxylic acid having the structural formula of the addition product of 1-pimaric acid and fumaric acid.

EXTRUSION. A Nicoli. U. S. 2,522,-632, Sept. 19. Extruding device for shaping plastic material.

KETONE CONDENSATES. J. R. Dudley (to American Cyanamid). U. S. 2,522,668, Sept. 19. Water-insoluble granular anion-exchange resins prepared by heating an aldehyde, an amino compound such as urea or melamine, and a ketone.

COPOLYMERS. H. W. Bryant (to Du Pont). U. S. 2,522,775, Sept. 19. Copolymerizing maleic anhydride and vinyl acetate.

RESIN. C. F. Peters (to Velsicol). U. S. 2,522,889, Sept. 19. Reacting cyclopentadiene under heat and pressure in the presence of a saturated fatty acid.

MOLDING. C. A. Nicholas, R. B. Bower, J. R. Edwards, W. A. Fletcher, H. W. McCoy, B. S. Sample, and G. L. Weiser (to General Motors). U. S. 2,523,137, Sept. 19. A plastic molding machine.

COPOLYMERS. H. G. Schneider and D. W. Young (to Standard Oil). U. S. 2,523,150, Sept. 19. Resinous copolymers of an olefin having 4 to 14 C atoms and a refinery C-4 cut and reacting in the presence of a Friedel-Crafts catalyst.

PRINTING. L. Rado. U. S. 2,523,-234, Sept. 19. Method of printing plastic objects during the molding operation.

POLYMERS. M. R. Dalton (to American Viscose). U. S. 2,523,282, Sept. 26. An acrylonitrile homopolymer dissolved in a binary mixture of nitromethane and alpha-hydroxypropionitrile.

RESINS. P. C. Schroy, J. Grabowski, and M. J. Scott (to American Cyanamid). U. S. 2,523,333-4-5-6, Sept. 26. Molding compositions comprising blends of melamine-formaldehyde and aniline-phenol-formaldehyde; aniline-cresol-formaldehyde; or aniline-xylenol-formaldehyde resins; and applications thereof.

MAKE THE NO* COMPARISON!

Series 4552 Compounder-Extractor-Extruder with oil heating equipment housed in base.

Does the Welding Engineers' compounder-extruder require a bulky pre-heater?

☆**NO** Wet or dry materials are fed directly to the hopper. After thorough plasticizing, the dual counter-rotating worms convey the hot materials under the patented open section where moisture and other undesirables "boil off" into the atmosphere. If further removal is necessary the open section can be fitted with vacuum equipment—thus making this unit a complete one-operation compounder-extractor-extruder.

Do material shortages continue to present a production problem?

☆**NO** All the basic virgin ingredients are compounded as required. No waiting for deliveries or paying premium prices for small quantities. And, remember, production costs go down when you process direct from raw materials in one step.

Does scrap stay on the "Loss Side" of the ledger?

☆**NO** The extra powerful positive feed of the dual counter-rotating worms will easily draw in scrap and eliminate "bridging" in the hopper. In most cases no pre-grinding is required. Reprocess your scrap, don't sell it at a discount or assign it to the waste pile.

WRITE FOR THE COMPLETE STORY: THERE ARE MANY MORE IMPORTANT "NO COMPARISON" FACTS THAT PROVE—

For the Best Production Method—Choose The Welding Engineers' Custom-Fitted Compounder-Extruder

MACHINERY DIVISION

WELDING ENGINEERS, INC.

NORRISTOWN, PA.

BE SURE TO INCLUDE A WELDING ENG

BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery.

"Sales Engineering" second edition by Bernard Lester

Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 226 pages. Price $3.00

This second edition, which has been enlarged about 10% to make it more complete, is concerned with the art of selling equipment and services which require engineering skill in their selection, application, and use. Mr. Lester has included not only the theory of selling but also an analysis of the sales engineer, his product, his market, and his training. Extensive illustrative material is drawn from the author's 35 years of experience. A distinction is made between the selling of consumer products and the selling of engineering products, and the author avoids the emotional and high pressure selling methods sometimes used in the commercial trade.

"Small Plant Management" edited by Dr. Edward H. Hempel

Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. 548 pages. Price $6.00

Designed to be a guide to practical "know-how" management of small plants, this book was prepared under the auspices of the Management Div. of the American Society of Mechanical Engineers. The volume presents an up-to-date compilation of small plant techniques, in four sections: Small Plants as Economic Factors; Management Tasks; How to Solve the Important Problems of Small Plant Management; and Small Plant Future. Each chapter was written individually by an expert in that particular field, and the authors were allowed complete freedom in the expression of their opinions. The result is an intensive study of modern concepts and procedures in the small plant management field.

"Chemical Engineering Catalog, 1950-1951"

Published by Reinhold Publishing Corp., 330 W. 42nd St., New York 18, N. Y. 1680 pages.

Data about equipment, machinery, raw materials, and heavy and fine chemicals used in industries employing chemical manufacturing processes have been brought up to date in this 35th edition of a series begun in 1915 by the American Institute of Chemical Engineers. The condensed and standardized information on such equipment and materials is presented in classified indices, carefully cross-referenced, which cover firms represented, trade-names, and manufacturers' catalogs. The book is distributed free of charge to members of the chemical industry in the United States. Outside this country the book sells for $20.00.

"Unit Operations" assembled by George Granger Brown and associates

Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 611 pages. Price $7.50

Modern process operations have many similarities in their basic principles. Thus, by studying the unit operations common to them, an engineer can be guided toward the successful design, construction, and operation of a plant for any new process. This precept, plus progressively and continuously building a student engineer's knowledge and power until he has a reasonably clear concept of how to approach processing equipment problems are the objectives of this comprehensive volume compiled by 12 authorities. The book is divided into four principal sections: solids; fluids; separation by mass transfer (the ideal stage concept); and energy and mass transfer rates.

Prologue to Tomorrow, by Robert Keith Leavitt—Written in observation of the one hundredth anniversary of Pennsylvania Salt Mfg. Co., Philadelphia, Pa., this history of the firm has been prepared on the theory that what has gone before should serve as a guide to the future. In tracing the firm's first century, the author, a neutral observer, has also sketched the growth of this country and has chronicled the role of Pennsalt chemical products in this nation's industrial development.

Recording gages (Bull. G621)—The company's "Series 500" line of recording gages is treated in this 32-page bulletin which sets forth complete information on pressure gages for ranges from 0 to 2 in. of water to 0 to 10,000 p.s.i.; vacuum gages; low-range draft and pressure gages; barometers; and absolute pressure gages for ranges as low as 0 to 6 mm. of mercury absolute. Measuring elements, operating principles, recording charts, and accessories for the various types of recording gages are described. Information also covers instruments for automatic controlling and telemetering. *The Bristol Co., 117 Bristol Rd., Waterbury 20, Conn.*

Electronic manufacturing methods—Two reports on electronic manufacturing processes, prepared for the Navy Bureau of Aeronautics by the Bureau of Standards, are now available. "Printed Circuits—Final Report," (PB 100 950) sells for $1.75; "Electronic Miniaturization," (PB 100 949) may be had for $4.75. *Office of Technical Services, Commerce Dept., Washington 25, D.C.*

pH electrodes, Catalog EN-S5—Both present and prospective users of the company's equipment will be interested in this 28-page catalog dealing with pH electrodes, assemblies, parts, and accessories. Advantages of each electrode type are listed, while a double-page spread illustrates in tabular form each assembly and all of its components. *Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.*

Air control valves—Complete specifications on the company's full line of valves for hand, foot, mechanical, or electrical control of single- and double-acting air cylinders are contained in this booklet. The catalog, consisting of individual data sheets for each product and a complete price guide, describes construction, operation, and valve services through the use of detailed drawings and dimensional tables. *Airmatic Valve, Inc., 1643 E. 40th St., Cleveland, Ohio.*

Fiberglas bibliography—This third edition contains 88 pages of 710 annotated references to selected articles which have appeared in 338 publica-

IF IT'S A MOLDED PRODUCT *– it's our baby!*

Continental is ideally situated to help you make profitable applications of molded plastics in your product

You can rest easy when your pet molding problem is in the hands of Continental engineers. They know plastics forward and backward. They have the best in compression, transfer and injection molding equipment to work with. And they make a habit of doing more than the expected.

Business machine housings, boxes, parts for the automotive, electrical and household appliance fields are just a few of the items Continental turns out for some of America's most important concerns.

Why not use your next job to get acquainted with Continental service? Our central location makes our deliveries as dependable as our product.

CONTINENTAL CAN COMPANY

Plastics Division

CAMBRIDGE, OHIO

100 East 42nd Street, New York 17, N. Y.
1721 NBC Building, Cleveland 14, Ohio
2201 Kenyon St., Indianapolis, Ind.
New Center Building, Detroit 2, Mich.
135 S. LaSalle St., Chicago 3, Illinois

tions, providing a ready-reference medium to material published about Fiberglas products. Applications documented in the report include use of the material in refrigerators, ranges and water heaters, forced warm air furnaces, reinforced paper and hose, wire and cable, insulated shipping containers, storage batteries, automobiles, trucks and trailers, and aircraft. *Owens-Corning Fiberglas Corp., Nicholas Bldg., Madison Ave., Toledo 1, Ohio.*

Consulting services—The 12th edition of this guide brings up to date the listing of consulting services available to the chemical and related industries. Information is presented in the following manner: the fields of problems are listed alphabetically with key numbers referring to the consulting services or specialists who can handle such problems; consultants are listed with a description of his and his organization's qualifications, scope and activities, and the services rendered; consultants are listed alphabetically with a geographic breakdown including branch offices here and abroad. *Association of Consulting Chemists and Chemical Engineers, Inc., 50 E. 41st St., New York 17, N. Y.*

Manpower planning for national emergency—Utilization of available manpower during periods of national emergency is the vital problem examined in this report. Compiling information received from key industries and federal agencies, the brochure discusses the following problems: placing the responsibility for planning; the company's role during national emergencies; conducting and interpreting an analysis of current personnel; filling the manpower gaps; company policies regarding national emergency leaves; and other considerations such as civil defense, safeguarding employee health, safety, and security. *Metropolitan Life Insurance Co., 1 Madison Ave., New York 10, N. Y.*

Electric cable hoists—This eight-page bulletin, well-supplemented with photographs, diagrams, and line drawings, gives full descriptions, specifications, prices, and ordering data on the Bob-Cat line of heavy-duty electric cable hoists. *The Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland, Ohio.*

Industrial temperature control—Basic principles of industrial temperature control have been set down in a 24-page manual aimed specifically at design and process engineers. Introducing the study is a description of the eight ways of responding to temperature, the five ways of putting that response to work, and nine basic instrument types produced by the company. Subjects underlined are the influence of firing systems upon the design of the control system, fundamental tenets of mercury-bulb installation, and basic concepts of electrical and mechanical control. *The Partlow Corp., Campion Rd., & Partlow St., New Hartford, N. Y.*

Your product in plastics—Pictures and information regarding molding and finishing plastics, plus illustrations of plastic products already on the market are included in this 16-page booklet. Also explained is this custom molder's Cost-Check plan whereby company engineers analyze designs without cost or obligation on the part of prospective users of molded plastics. *The General Industries Co., Dept. R., Elyria, Ohio.*

Tank storage—A typical system for the bulk tank storage of plasticizers is described in this 12-page bulletin. Drawings of typical equipment types and arrangements, plus data on pertinent properties of some of the firm's plasticizers, are included. *Monsanto Chemical Co., St. Louis 4, Mo.*

Sabotage—how to guard against it—This is a 12-page reprint of the best-selling manual of the same title by Harry D. Farren which first appeared in 1940. The booklet is available for 25¢ for single copies. *National Foremen's Institute, Inc., New London, Conn.*

Made for each other—Problems encountered in labeling containers are discussed in this booklet which also suggests solutions. Methods are outlined for dealing with high-speed operations and also for labeling of glass, crayons, batteries, and other difficult surfaces. Also covered are suggestions for overcoming difficulties arising from labeling with foil or acetate-laminated labels, heavily varnished stocks, or odd-shaped labels. Another type of labeling problem discussed is that arising from foreign conditions on the surface to be labeled such as greasiness and wet, hot, or cold bottles. *Polymer Industries, Inc., 284 Sheffield Ave., Brooklyn 7, N. Y.*

Vinsol resins—The expanding use of Vinsol resin in the production of Buna N cements and adhesives is described in this new 12-page booklet. A good combination of properties, including adhesiveness, compatibility with adhesive film-formers, and relatively low cost are discussed as factors contributing to the growing use of this material as a resin modifier. Emphasis is placed on what the formulator can do with Vinsol in Buna N cements and adhesives, although other adhesive types are mentioned. *Hercules Powder Co., 931 Market St., Wilmington, Del.*

Standards are your business—This 24-page pamphlet explains the workings of the American Standards Association and its efforts to establish nation-wide uniformity for engineering, commercial, consumer, and safety standards, rather than company or industry standards. Information is included on how national standards can be translated into dollar savings for both the manufacturer and consumer. *American Standards Association, 70 E. 45th St., New York 17, N. Y.*

Data book—The 1950 edition of this 38-page catalog contains up to date prices, application recommendations, and other information concerning instrument sensing units and associated accessories. Among the special items listed are resistance bulbs and wells, radiation detector, special thermocouples for plastic injection and extrusion machines, and a new molten metal thermocouple for ferrous metals. Essential data are presented on making, checking, selecting, and ordering thermocouples; wire sizes and resistances; and temperature. *Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.*

Cyclon—Information and technical data on Cyclon corrosion-resistant compounds for processing industries are included in this eight-page folder. Among the standard products covered are industrial coatings, adhesives, process equipment linings, extrusions, and chemical tubing and piping. *Munray Products, Inc., 12500 Crossburn Ave., Cleveland 11, Ohio.*

There's a HEYDEN chemical to serve your purpose!

Among the important industrial fields in which Heyden products are used constantly and in ever increasing tonnages are:

DRUGS AND PHARMACEUTICALS.
CHEMICALS, PETROLEUM AND SOLVENTS.
PLASTICS, TEXTILES AND LEATHER.
PAPER AND PULP.
FOODS AND BEVERAGES.
PAINTS, VARNISHES, LACQUERS AND RESINS.
PERFUMES AND COSMETICS.

The Heyden technical staff invites consultation and inquiries on your problems of production, formulation and improvement of existing processes. The following list of Heyden products may help you to select and investigate the chemical you are seeking to do a better and more economical job in your plant or process.

HEYDEN PRODUCTS FOR INDUSTRY AND RESEARCH

ACETYLSALICYLIC ACID

BENZALDEHYDES
- Benzaldehyde
- Ortho-Chlorobenzaldehyde
- Para-Chlorobenzaldehyde
- 2,4-Dichlorobenzaldehyde
- 3,4-Dichlorobenzaldehyde

BENZOATES
- Calcium Benzoate
- Ethyl Benzoate
- Methyl Benzoate
- Sodium Benzoate

BENZOIC ACIDS
- Benzoic Acid
- Ortho-Chlorobenzoic Acid
- Para-Chlorobenzoic Acid
- 2,4-Dichlorobenzoic Acid
- 3,4-Dichlorobenzoic Acid

BENZOTRICHLORIDES
- Benzotrichloride
- Ortho-Chlorobenzotrichloride
- Para-Chlorobenzotrichloride
- 2,4-Dichlorobenzotrichloride
- 3,4-Dichlorobenzotrichloride

BENZOYL CHLORIDES
- Benzoyl Chloride
- Ortho-Chlorobenzoyl Chloride
- Para-Chlorobenzoyl Chloride
- 2,4-Dichlorobenzoyl Chloride
- 3,4-Dichlorobenzoyl Chloride
- Anisoyl Chloride

BENZYL CHLORIDES
- Benzyl Chloride
- Ortho-Chlorobenzyl Chloride
- Para-Chlorobenzyl Chloride
- 2,4-Dichlorobenzyl Chloride
- 3,4-Dichlorobenzyl Chloride

BROMIDES
- Ammonium Bromide
- Calcium Bromide
- Lithium Bromide
- Potassium Bromide
- Sodium Bromide
- Strontium Bromide

CHLOROTOLUENES
- 2,4-Dichlorotoluene
- 3,4-Dichlorotoluene
- Ortho-Chlorotoluene
- Para-Chlorotoluene

CREOSOTES
- Creosote
- Creosote Carbonate
- Calcium Creosotate
- Potassium Creosote Sulfonate

FORMALDEHYDES
- Formaldehyde
- Paraformaldehyde
- Hexamethylenetetramine

FORMATES
- Formic Acid
- Sodium Formate

GLYCEROPHOSPHATES
- Calcium Glycerophosphate
- Ferric Glycerophosphate
- Glycerophosphoric Acid
- Magnesium Glycerophosphate
- Manganese Glycerophosphate
- Potassium Glycerophosphate
- Sodium b-Glycerophosphate
- Sodium Glycerophosphate

GUAIACOLS
- Guaiacol
- Guaiacol Carbonate
- Calcium Guaiacolsulfonate
- Magnesium Guaiacolsulfonate
- Potassium Guaiacolsulfonate

PARASEPTS®
(Parahydroxybenzoates)
- Methyl Parasept
- Ethyl Parasept
- Propyl Parasept
- Butyl Parasept
- Benzyl Parasept

PENICILLIN

PENTACIZERS®
- Pentacizer 131

PENTAERYTHRITOLS
- Pentek®
- Dipentek®
- Tripentek®
- Monopentek
- Pentaerythritol, Purified

PENTAMULLS®
- Pentamull 126

PENTAWAXES®
- Pentawax 145
- Pentawax 177
- Pentawax 217
- Pentawax 218
- Pentawax 227
- Pentawax 242

PROTEINATES
- Collargol® (Colloidal Silver)
- Copper Protein
- Silver Protein Mild
- Silver Protein Strong
- Tin Protein

SALICYLATES
- Ammonium Salicylate
- Calcium Salicylate
- Lithium Salicylate
- Magnesium Salicylate
- Manganese Salicylate
- Methyl Salicylate
- Phenyl Salicylate
- Salicylic Acid
- Sodium Salicylate
- Strontium Salicylate

STREPTOMYCIN

OTHER PRODUCTS AND INTERMEDIATES
- Acetanilid
- Aktivin®
- Anisic Acid
- Benzal Chloride
- Benzilic Acid
- Beta-Oxynaphthoic Acid
- Corpolin®
- Dibenzyl Ether
- Flexin P®
- Hydrochloric Acid
- Hypol
- Ichthynat® (Ichthammol)
- Lignocol®
- Methylal
- M.D.A.®
- (Methylene Disalicylic Acid)
- Para-Hydroxybenzoic Acid
- Paratoluidine
- Phenol
- Propyl Gallate
- Resorcinol
- Saccharin
- Saccharin Sodium
- Sulfidal® (Colloidal Sulfur)
- Thorotrast®
- (Colloidal Thorium Dioxide)
- Tolyl Aldehyde
- Umbrathor®
- (Colloidal Thorium Dioxide)

SPECIAL PRODUCTS FOR RESEARCH
- Benzil
- Benzoin
- Benzyl Sulfonamide
- Benzyl Sulfonyl Chloride
- 4,4'-Dichlorobenzophenone
- Ortho-Chlorocinnamic Acid
- Ortho-Cresotinic Acid
- Para-Benzyl Phenol
- Pentaerythritol Diacetal
- Pentaerythritol Dibutyral (N)
- Pentaerythritol Diformal
- Pentaerythritol Dipropional
- Trioxane

FINE HEYDEN CHEMICALS

SERVING INDUSTRY THROUGH FINER CHEMICALS

HEYDEN CHEMICAL CORPORATION 393 SEVENTH AVENUE, NEW YORK 1, N. Y.

NEW MACHINERY AND EQUIPMENT

World's Largest Injection Machine

THE molding equipment illustrated below is the largest injection machine (300-oz.) that has ever been built. The manufacturer, The Watson-Stillman Co., Roselle, N.J., states that two of these machines will be completed and shipped before the close of this year. One will be installed at Amos Molded Plastics, Div. of Amos Thompson Corp., Edinburg, Ind., and the other at General American Transportation Corp., Chicago, Ill., which recently installed two similar 85-oz. machines, both of which are convertible to 300-oz. capacity.

These fully hydraulic machines are equipped with manual as well as automatic single-cycle control and adjustable speed control of the injection ram. Individual adjustable control of injection and clamping pressures is also provided.

Because of the immense capacity per shot and the clamping pressure of 1500 tons, coupled with a platen area which will accommodate a mold measuring 4 by 6 ft., this machine is able to produce injection-molded parts of a size and weight hitherto unheard of. These machines are designed with a maximum stroke of 4 ft. and a daylight opening of 6 feet. These details will enable the molders to produce parts with deeper draws than ever before possible by injection. With equipment of this size, new markets for thermoplastic parts will be opened, and those markets already invaded will be greatly widened. The refrigeration industry has wanted a one-piece injection-molded inner door liner for some time, and the production of such a part is now made possible. As a matter of fact, this equipment should be able to produce a complete refrigerator inner box in one piece. Plastic washing-machine agitators have been standard for quite a while, and it is entirely conceivable that the entire tub will now be injection molded.

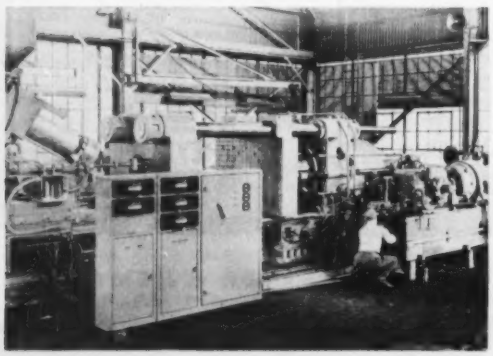
The size of equipment available up till now has limited the scope of thermoplastics in both television and radio housings. Much of this limitation is now removed, and thermoplastics can become competitive with thermosets in many of the larger applications which have been developed for housings.

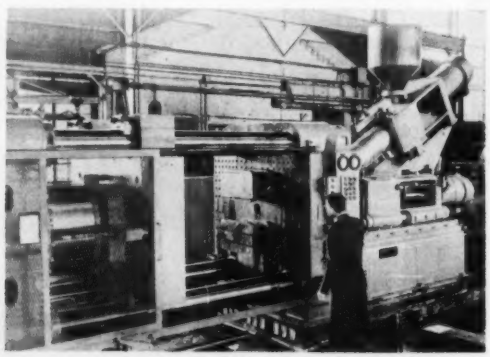
Machine Specifications

Capacity of hopper in lb.	500
Maximum oz. per shot	300
Maximum per shot cu. in.	390
Plasticizing cylinder oz. per stroke	85
Plasticizing cylinder lb. per hr.	300
Die closing in. per min.	550
Die opening in. per min.	525
Injection shooting (at max. pr. 21,000 p.s.i.) in. per min.	115
Injection shooting (at max. pr. 9250 p.s.i.) in. per min.	260
Plasticizing forward in. per min.	115
Plasticizing return in. per min.	210
Main pump — Oilgear DXP-10025, Gal.	71.4
Holding pump — Oilgear HG-830, Gal.	4.7
Circulating-Vickers V-135-U-S76, Gal.	33.0
Shooting plunger dia.	5 in.
Injection hydraulic cylinder dia. (21,000 p.s.i. on plunger)	13½ in.
Injection hydraulic cylinder ram dia. (9250 p.s.i. on plunger)	9 in.
Injection hydraulic cylinder stroke	21 in.
Injection hydraulic cylinder max. pressure p.s.i. (adjustable)	2850
Plasticizing plunger dia. (21,000 p.s.i.)	5 in.
Plasticizing hydraulic cylinder dia.	13½ in.
Plasticizing hydraulic cylinder stroke	17 in.
Plasticizing hydraulic cylinder pressure p.s.i.	2850
Clamp cylinder dia.	36 in.
Clamp cylinder pressure (adjustable) max. p.s.i.	3000
Clamp cylinder cap. tons	1500

(*Continued on p.* 126)

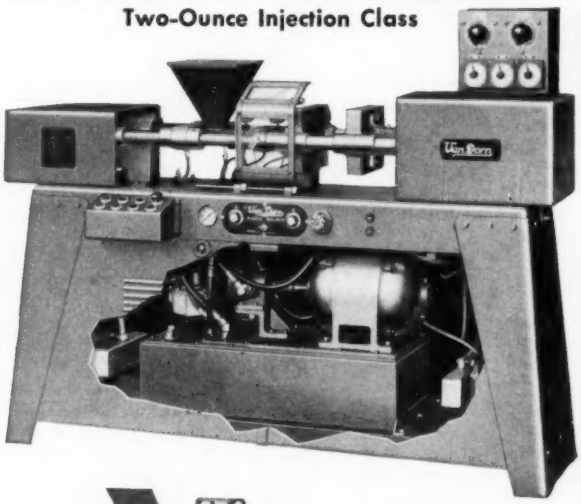
Two views of new 300-oz. injection machine in final stages of assembly. In photo at left, mechanic is completing the wiring on huge pumping unit. Photo at right shows immense size of platens, on which are mounted pressure pads for testing purposes



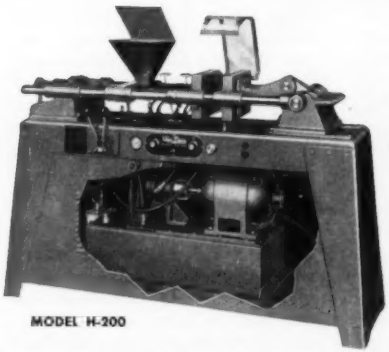


Produce Plastics Profitably With This
VAN DORN Equipment

Model H-200—Leader in the Semi-Automatic Two-Ounce Injection Class



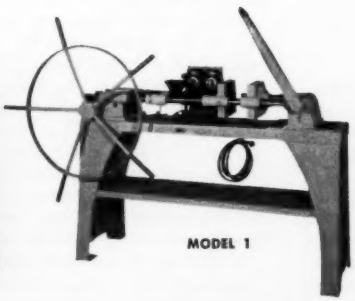
This ultra-modern press molds practically all thermoplastics including nylon. It completes up to 6 operating cycles per minute. Push button controls are safe, simple and convenient. Compact and rugged, the unit is quiet and economical in operation. Sliding gate with interlocking safety devices starts the cycle. Solenoid valves close the molds. Injection and dwell are controlled by first of three timers on the rear panel. Center timer regulates recharging of heater. The third timer controls the length of the mold close cycle; when time runs out, molds automatically open and parts are ejected. Operator opens safety gate, removes product and then closes gate to begin the next cycle . . . Variable voltage transformers in conjunction with thermostatic units control the temperatures on the two heating zones accurately.



MODEL H-200

Power Operated, Lever Controlled Presses

2-oz. or 1-oz. capacity. These low-cost units operate 8 hours for under a dollar and use inexpensive molds. Can easily be set up in twenty minutes by one man.



MODEL 1

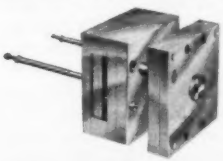
Manually Operated Press

1-oz. capacity. This press is ideal for smaller jobs, experimental work and technical training.

MODEL G-100

Plastic Grinder

Grinds up rejects, waste, etc., for re-use. Ruggedly made, designed for easy cleaning.



Mold Bases

Available from stock for all Van Dorn presses.

Write for Bulletins on this Equipment

THE *Van Dorn* IRON WORKS CO.

2687 EAST 79th STREET • CLEVELAND 4, OHIO

Cable Address: "VANDORN" Cleveland

Clamp cylinder stroke	48 in.
Stripping cap. in tons	98
Daylight opening	72 in.
Daylight opening with spacer	60 in.
Min. die thickness	24 in.
Min. die thickness with spacer	12 in.
Max. die sizes: width	72 in.
height	48 in.
Rated max. power consumption of heating k.w.	50
Total motor h.p.	90
Oil reservoir cap. gal.	550
Floor space:	
machine	6 ft. 6 in. x 31 ft.
pumping unit	5 ft. 3 in. x 11 ft.
Overall height	12 ft. 8½ in.
Shipping weight machine — tons	69
Shipping weight pumping unit —tons	7½

HAND SEALER—What is said to be a new principle of sealing (for which a patent is pending) is employed in a hand sealer for polyethylene now being distributed by Amsco Packaging Machinery, Inc., 31-31 48th Ave., Long Island City, N.Y. The new technique is designed to eliminate the problem of polyethylene sticking to the sealing iron. Amsco's sealer is very light in weight, permitting the user to operate it for long periods without experiencing excessive fatigue. Seals are claimed to be neat and secure without requiring exacting pressure application or heat dwell time. The sealer is also suitable for all homogeneous films which seal by weld.

PRECISION SWITCH—A special roller-plunger is used in a new compact precision switch developed by Unimax Switch Div., The W. L. Maxson Corp., 460 W. 34th St., New York 1. The switch, type MX is designed to be built into machine tools or other apparatus in which electric control is to be initiated by movement of a cam or dog. It is capable of absorbing overtravel up to 7/32 inch. A threaded bushing provides for single hole mounting and permits accurate positioning of the roller-plunger in relation to the cam or dog. A stainless steel roller in the top of the overtravel plunger serves to minimize friction in the mechanical actuating system.

BAG END HEAT SEALER—Fast, simple, and positive sealing of bags made of heat-sealable plastics, sheets, film, and tubing up to about 0.008 in. thick is assured by the Bag End Sealer made by Sta-Warm Electric Co., 503 N. Chestnut St., Ravenna, Ohio. Temperatures are controlled by an adjustable automatic thermostat preset by Sta-Warm at its plant in accordance with the material to be used. The device, which will handle seals from 6 to 16 in. long, is furnished with either of two types of sealing units: a model for solid seal when this method is required; and type PB—recommended for most plastics—which has three horizontal lines spaced evenly over a ¼-in. wide area.

PRECISION DRILL GRINDERS—Absolute simplicity, speedy operation, and production economies are merits attributed to three Black Diamond Precision Drill Grinders manufactured by Black Diamond Saw & Machine Works, Inc., Natick, Mass. The grinders are said to be the only ones on the market capable of sharpening small wire gage and fractional drills quickly and with complete accuracy. Drills are held in a fixed position, and drill lips are ground to exactly the same length, at the correct angle, and with the proper clearance to insure long life and efficient cutting.

No mechanical knowledge or skill is necessary to operate the Black Diamond, since the machine requires no adjusting to accommodate any drill within its capacity. Capacities of the three models for two-lipped drills are: No. 1—twist drills, No. 60 wire gage to 1½ fractional; No. 2—straight shank and No. 1 Morse Taper Shank drills, ⅛ to 1½ in.; and No. 3—straight shank, and No. 1 and No. 2 Morse Taper Shank Drills, ¼ to ¾ inch. The grinding wheel is of the dry-cutting, cup type and is dressed, when necessary, by means of a diamond permanently set in a swinging lever—to insure a correctly dressed wheel for accurate grinding. Additional accessories available include special locators, extra bushings needed to increase grinder capacity, and a web-thinning attachment for grinding the notched or crank shaft point on drills and for facing off drill cutting lips.

STRETCH METER—The percentage of stretch or shrinkage of materials being processed though pairs of rolls turning at different speeds is indicated by the new Tag-Weston recording speed-ratio tachometer produced by the Tagliabue Instruments Div., Dept. 414, Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N.J. The device provides a continuous record of roll speed ratio for plastics, textile, paper, rubber, chemical, and metal-rolling industries.

Operated by two Weston Model 724 tachometer generators driven by the respective rolls, the new instrument consists essentially of a specially developed Tagliabue Model 47001 Celectray ratio recorder. The ratio meter and recorder can be calibrated in any units which are a function of the speed ratio between two rotating members. Various calibration ranges and chart graduations are available to comply with specific requirements.

CONICAL BLENDER—Formation of agglomerates during mixing of a wide variety of products and materials, which contain small amounts of moisture, is prevented in a new disintegrating conical blender designed by The Patterson Foundry & Machine Co., 41 Helene St., E. Liverpool, Ohio. The blender is equipped with disintegrating elements mounted on a shaft extending through the blender trunnion. These elements, rotating at high speed and in counter rotation to the blender proper, break up agglomerates that are formed (particularly in materials characterized by small particle size), but particle size is not reduced. The equipment is produced in sizes having operating capacities of 0.35 to 550 cu. ft., and is available in mild steel or alloys as required.

PUNCH AND DIE STORAGE—A new storage box for punches and dies, which includes a vapor-type rust inhibitor, is now available from F. J. Stokes Machine Co., 5934 Tabor Rd., Philadelphia 20, Pa., maker of punches and dies and many types of compression molding machines requiring such equipment. The new container accommodates complete sets of punches and dies for both the B-2 and BB-2 rotary tabletting presses. It is compact (17 in. long, 6½ in. wide, and 7 in. deep), and thus easily moved from storage to tablet machine—an advantage when keeping sets intact and in perfect condition during storage or while in transit presents a problem.

Eyes Right...

Yes, it's "eyes right"... when merchandise is packaged in tough, transparent Kodapak Sheet. Lingerie, for example, in gauges .0075 to .020. Slips, gowns, hosiery—at their loveliest; colors show up clear and bright; textures, touches of handwork, stand out in infinite detail. Shoppers stop, look—and buy—without fingering; stocks stay fresh, salable.

Kodapak Sheet is easy to handle, comes in two basic forms: Kodapak I Sheet, cellulose acetate, gauges up to 0.060″; Kodapak II Sheet, cellulose acetate butyrate, gauges up to 0.002″.

Both are made to the same high standards, under the same rigid conditions as Kodak photographic film base.

Kodapak Sheet is made by Kodak for use by a wide range of fabricators. For further information about this product and its end uses, consult your nearest representative, or write Kodak. If you have a particularly complicated problem, a day or two in the Kodapak Demonstration Laboratory in Rochester will prove helpful. Make an appointment today.

Cellulose Products Division, Eastman Kodak Company, Rochester 4, N. Y.

Sales offices:
New York, Chicago.

District sales representatives:
Cleveland, Dallas, Philadelphia, Providence.

Pacific Coast distributor:
Wilson & Geo. Meyer & Co., San Francisco, Los Angeles, Portland, Seattle.

Canadian distributor:
Paper Sales, Limited, Toronto, Montreal.

FOR THE DISPLAY YOU WANT... THE PROTECTION YOU NEED

Kodapak Sheet

"Kodapak" is a trade-mark

Kodak

Nacromer
A PEARLY PIGMENT

NACROMER is an excellent substitute for Pearl Essence where cost is a factor and where the high brilliance of natural pearl is not necessary.

It is—

- **Stable**
- **INERT**
- **NON-CORROSIVE**

Sample and literature sent on request.

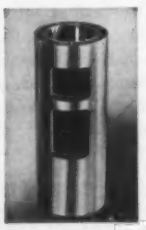
THE MEARL CORPORATION

153 WAVERLY PLACE NEW YORK, N. Y.

"World's Largest Producer of Pearl Essence"

Extruders
find Xaloy-lined cylinders
hard to beat

INCREASE YOUR PRODUCTION!
DECREASE YOUR COSTS!



- **Xaloy** liners are highly resistant to abrasion and corrosion.
- **Xaloy** minimizes contamination.
- **Xaloy** reduces friction.
- **Xaloy** has uniformity of quality.
- **SPECIFY XALOY LINERS TO YOUR SUPPLIERS**

FOR CORROSION RESISTANCE
FOR ABRASION RESISTANCE

Xaloy

Xaloy 306

INDUSTRIAL RESEARCH LABORATORIES, LTD.
961 EAST SLAUSON AVENUE
LOS ANGELES 11, CALIFORNIA

WRITE FOR ENGINEERING AND PRODUCTION DATA BOOK!

Aid to advertising is display piece of vinyl film which sticks without adhesive

Display Sticker

LATEST application of vinyl film that adheres without adhesive is Plas-Stik, a display sticker that clings to glass and enameled, glossy, painted, or metal surfaces. The new product, introduced by The Decal Plas-Stik Co., New York, N.Y., is made from vinyl film cast of Geon paste resin, produced by B. F. Goodrich Chemical Co., Cleveland, Ohio.

Plas-Stik is particularly suited to merchandising display, since an advertiser's name, slogan, or trademark can be imprinted on it in multi-colors by the silk-screen process. Although it sticks readily, it can be removed easily and, unlike conventional stickers, leaves no mark or stain. After removal, it can be used again.

The new stickers can be cast in thicknesses ranging from 3 to 10 mils, or heavier if desired. After casting, the material can be cut into an unlimited variety of shapes to suit the end use.

Among the other advantages offered by Plas-Stik, and which are not present in display pieces using conventional materials, are: it can be brilliantly printed in a wide color range; it can be kept clean with a damp cloth; and it occupies a minimum of counter or storage shelf space. Currently, the product is being developed for advertising by several firms in the soft drink, drug, distillery, and brewery fields.

CUSTOMERS RE-ORDER with confidence from NORTON

Customer: Cory Corporation

AN APPLIANCE manufacturer's requirements for molded plastics are diversified and exacting . . . So when the Cory Corporation keeps placing orders for a variety of parts and components with the same supplier over a period of years, it's a good indication that the moldings they've been getting and the prices they've been paying have been right.

A decanter cover, a coffee-maker bowl and a measuring cup are among the molded items Norton has delivered to the Cory Corporation since 1935.

The Cory Corporation knows the value of Norton's sound engineering, cooperative service, flawless molding, sensible pricing and dependable deliveries . . . And we hope you will learn their value, too.

Norton is interested in cultivating *your* molding business. Ask for a free survey of your next molding assignment by a Norton engineer from our nearest sales office. Write today. Norton Laboratories, Inc., Lockport, New York. Sales Offices: New York—347 Fifth Avenue; Chicago—5221 Kimbark Avenue.

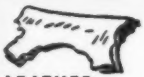
NORTON *Laboratories, Inc.*

COMPRESSION AND INJECTION MOLDING

From these MONOMERS...
ACRYLIC
ACRYLONITRILE
BUTADIENE
VINYL ACETATE
VINYL CHLORIDE
METHACRYLIC
STYRENE
ALLYL
MALEIC

POLYMERS and COPOLYMERS for all industry

ADHESIVES
Wood glue
Shoe, paper, leather
Fabric
Heat seal coatings
Book binding
Ceramic
Metal foil
Plastic film



LEATHER
Pigment binding
Synthetic gums
Leather waste binders
Tanning agents
Box toe stiffeners

PAPER
Greaseproofing
Saturated tape and tablecloth papers
Wall paper
Waterproofing
Stiffening
Transparentizing
Pigment binding
Coating
Heat Seal

TEXTILES
Hosiery finish
Permanent finishes
Stiffening felts
Coatings for artificial leather
Pile fabrics
Rayon warp sizing

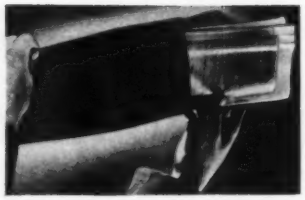
RUBBER
Synthetic latices
Hardeners for GRS
Tackifiers for latex
Latex thickeners

PAINT-LACQUER
Emulsion paints
Paint and lacquer resins
Solution polymers
Nitrocellulose compounding resins

PRINTING INKS
Resins

★ AMERICAN ★
POLYMER CORPORATION

General Offices: 103 Foster Street, Peabody, Massachusetts



Photos courtesy Bakelite Div.

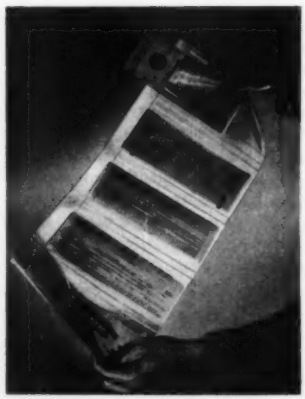
Up to 24 document envelopes can be held in protective case made of vinyl

Document Holder

POCKET-TYPE envelopes of translucent Vinylite film fit into a carrying case made of Vinylite sheeting to offer protection for such valuable documents as insurance policies and deeds against soiling, unnecessary handling, and tearing. The envelopes, produced by Carson Glove Co., San Rafael, Calif., for Rough Notes Co., Inc., Indianapolis, Ind., are fabricated in strips which can be cut into sections of one or more pockets. Papers in these containers are easily visible through the translucent vinyl.

Heat-sealed seams between pockets provide space to emboss a company or private name. Each pocket will hold two insurance policies, for example, while the case will hold as many as two dozen pocket-envelopes. Both the envelopes and case are resistant to aging, abrasion, moisture, mold, and mildew, and can be easily cleaned.

Strips of vinyl film envelopes can be cut off to provide one or more pockets



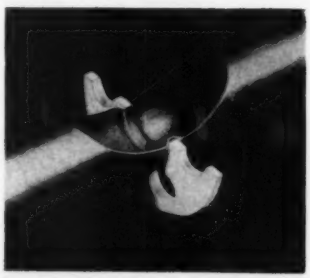
Coaxial Spacers

ONE of the technical difficulties in television transmitting stations has been overcome by the substitution of Du Pont's Teflon tetrafluoroethylene for ceramics as the material from which spacers for coaxial cable transmission lines are made. These spacers serve as insulators between the inner and outer copper conductors of the line.

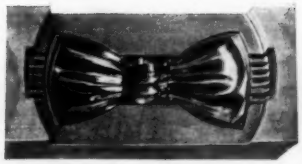
Accepted practice calls for spacers with as low power loss as possible, yet which will withstand the relatively high temperatures built up within a transmission installation. Teflon fills the bill. Although this material is more expensive than the ceramic it replaces (in a ratio of about 13 to 1), it provides efficiency and a corresponding saving in power. Since power generating costs are high in T.V. operations, this saving quickly offsets Teflon's initial cost. Teflon's efficiency rating is 76.4%.

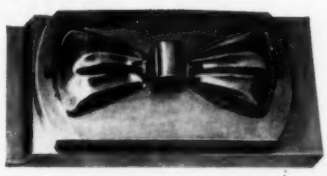
Another asset of Teflon is its low dielectric constant which makes it a simple matter to eliminate reflections caused by impedance discontinuities introduced at each insulator. By changing the thickness of the spacers to compensate for the difference between the dielectric constant of air (considered to be the ideal insulation) and that of the spacer material, the problem of reflections from a line of spacers can be solved. In addition, Teflon is tough—an important factor in both the manufacture and installation of transmission lines. Finally, Teflon spacers can be slipped over the line and fitted into grooves—a much simpler installation method than that required for assembling ceramic spacers.

Cross-section of tetrafluoroethylene spacer and coaxial transmission line



are you paying a premium for plastic molds?





Every time parts are rejected, unsatisfactory finishes jeopardize sales appeal, or a mold causes production tie-ups, you're paying through the nose. You'd be surprised how many buyers of plastic parts are paying a premium—simply because they figured on saving a few pennies on mold costs. What's the answer? Simply this: If you buy plastic parts outside, put the job into the hands of a custom molder backed by a skilled moldmaker.

Good molds actually *cost less* on the long pull. For the reputable molder and moldmaker not only start with the best steel—but invest extra care and skill to meet your exact requirements. Result: *dependable* molds that run longer, impart better finishes, reduce unit costs.

For years, skilled molders and moldmakers have staked their reputations on Carpenter Electric Furnace Mold Steels. They find it pays in many ways to buy from Carpenter—*specialists* in mold steels. The Carpenter Steel Co., 112 W. Bern St., Reading, Pa. Export Address: Woolworth Bldg., New York 7, N. Y.

When you have mold work done outside, consult a custom molder backed by a reputable moldmaker!

Write for useful leaflet on Samson Extra!

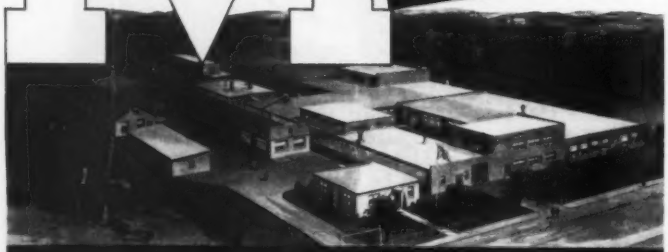
NEW JERSEY TOOL & DIE CO. made the molds used to produce this decorative bow on cosmetic containers for MACK MOLDING CO. Cavities and force plugs were hobbed. Moldmaker says, "Carpenter SAMSON EXTRA hobbed with less pressure than that required for any other mold steel with comparable mechanical properties". Over 1,500,000 perfect parts produced to date.

SPECIFY *Carpenter* ELECTRIC FURNACE MOLD STEELS

GUARANTEED CLEAN DIOK SOUND UNIFORM

100% Acid Disc Inspected

COMPRESSION
INJECTION
EXTRUSION
FABRICATION



MICHIGAN MOLDED PLASTICS, INC.

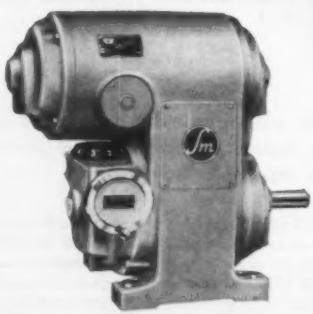
Plant and General Offices: DEXTER, MICHIGAN

Sales Offices:
DETROIT
BUFFALO
ELYRIA, OHIO
PHILADELPHIA
MINNEAPOLIS
ST. LOUIS
MILWAUKEE
CHICAGO
MOLINE, ILL.
SOUTH BEND
LANSING

power modernization

lowers production costs...

with control of speed



STERLING SPEED-TROL

. . . Gives You Variable Speed Control Necessary For:

- **PROCESS CONTROL OF:** Temperature—viscosity—level—pressure—flow—etc.
- **TIME CONTROL OF:** Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.
- **EQUIPMENT ADAPTATION TO:** Load variation—sequence synchronization. Size—tension—hardness or shape of materials to be processed—machined—conveyed—blended—mixed—etc.
- **VARIATIONS IN:** Quality—quantity—operators' abilities—etc.

Ask for your copy of pictorial bulletin No. C-67, showing Sterling Electric Power Drives Turning The Wheels of Industry.

STERLING ELECTRIC MOTORS

Plants: New York 51, N. Y.; Los Angeles 22, California; Hamilton, Canada; Santiago, Chile.
Offices and distributors in all principal cities.

Turnover Switch

THE fire hazard resulting from gasoline spillage in auto, truck, or bus accidents may be considerably reduced by the use of a new safety switch incorporating a cylinder injection molded of transparent Plexiglas by Clapp Co., Dallas, Tex. Approved by Underwriters' Laboratories, Inc., the safety switch cuts off ignition current the instant the vehicle tips to a 45° angle.

The cylinder of the safety switch is about 1 in. in diameter and 2⅛ in. high. Since the plastic material is highly shatter-resistant, the switch body is able to withstand the impact of a slipping wrench or other accidental blows. Also, it remains unclouded in the presence of gasoline and oil fumes, is unaffected by under-hood heat, and does not become brittle with age.

Terminals are mounted securely in a phenolic block at the bottom of the cylinder, and are covered with ½ in. of mercury. The switch is mounted vertically under the hood, usually on the front face of the fire wall, so that when the vehicle tilts to 45°, the mercury flows away from one terminal, breaking the ignition circuit. The phenolic block serves as a baffle to prevent accidental disruption of the current.

The switch is installed by attaching it by two self-tapping screws through a plated metal bracket. Two leads of vinyl-covered wire are cut into the 6-volt primary wire running from coil to distributor. Special connectors make tight contacts when they are squeezed into a flattened position.

Installing turnover switch which has a cylinder injection molded of acrylic

Now! SPEEDY PRODUCTION OF POLYESTER LAMINATES

with

DRYPLY

THE COMPLETE POLYESTER LAMINATING MATERIAL

LOW PRESSURE LAMINATING MADE EASY WITH DRYPLY

The simplicity of operations with Dryply has opened new doors in polyester low pressure laminating. Now, production speed and production economy can be attained without any noticeable revisions in present manufacturing setups. This new reinforced material elevates the low pressure field to equal other mass production methods. Cured parts can now be formed at as fast a rate as 15 seconds.

RESIN CONTENT CONTROLLED

Quality finished parts are assured, as Dryply resin content is rigidly controlled by a continuous mechanical impregnating process. Messy, inefficient, wet lay-up is eliminated. Dryply comes to you ready-to-use in a dry state with catalyst already added.

NO WASTE WITH DRYPLY

Dryply comes in ready-to-form rolls. . . . No liner. . . . Unrolls like a roll of paper. You just cut your patterns to desired size and thickness and store left-over pieces for future use. Remember, Dryply can be stored for six months or longer under normal room temperature.

HERE'S WHAT DRYPLY SAVES YOU

You save TIME through speed of application. . . . You save LABOR because there are fewer operations and unskilled personnel can do the job. . . . You save MATERIAL since there is no waste.

DRYPLY is used in forming by:

(a) Male and Female Molds
(c) Pressure Bag Forming
(b) Cellophane Wrap
(d) Vacuum Bag Forming

Ready to Form

Right Off the Roll

Nothing to Add

Wet Lay-Ups Eliminated

DRYPLY has many uses for many industries

AIRPLANE
AUTOMOBILE
REFRIGERATION
AIR CONDITIONING
TELEVISION
RADIO
TOY
BOAT
ELECTRICAL
PACKAGING

also Prototypes and Models

CHECK THE QUALITIES OF DRYPLY FOR YOUR PRODUCT

Dryply has proven to be extremely versatile. Day by day, new uses are discovered and its application is becoming widespread in a variety of industries. We invite you to learn all about Dryply.

ABC operations with DRYPLY

A—Cut Material
B—Place on Form
C—Cure Under Heat and Pressure

DRYPLY NOW AVAILABLE IN BOTH GLASS MAT AND CLOTH

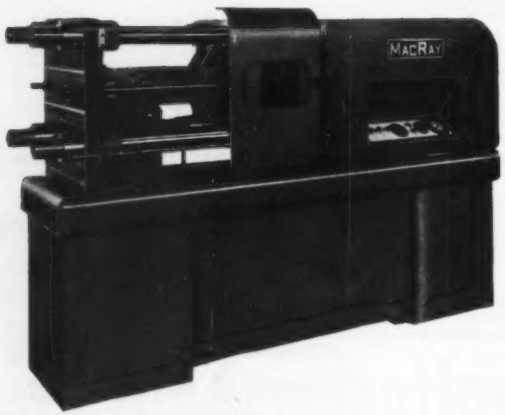
DRYPLY Shelf Life
6 MONTHS
OR LONGER
At Normal Room Temperature

Flexfirm PRODUCTS
POLYESTER DIVISION
2300 No. Chico Ave. El Monte, Calif.
FOrrest 8-7627

NEW MOLDING ECONOMY
for small pieces with LARGE areas

MACRAY 4 ounce Injection Molding Machine

Model 4 — MACRAY Semi-Automatic Machine
Model 4A — MACRAY Fully Automatic Machine



For those small shot jobs in big molds, there's no need to tie up your larger machines. Mold with maximum economy in the NEW MACRAY 4-oz. machine. Accommodates molds up to 12" x 23", mounted vertically . . . 13⅜" x 20", mounted horizontally.

And look at these other outstanding MACRAY features . . .

- Simplicity of operation
- Centralized controls
- More efficient cooling
- Longer strain rod bearing
- New longer heating cylinder
- Rugged construction
- Requires minimum floor space
- Prompt deliveries

Write . . . wire or phone for bulletin, price and specifications.

MACRAY ENGINEERING CO.
6611 Euclid Avenue, Cleveland 3, Ohio

A few choice territories are available

Printed label on battery is protected by laminating with cellulose acetate

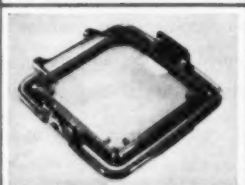
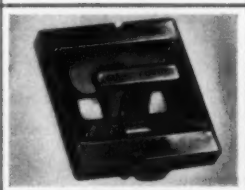
Battery Wrap

HEARING-AID "B" batteries made by Electrical Div., Olin Industries, Inc., New Haven, Conn., gain increased shelf life as the result of a new polyethylene envelope in which every shipping container of 12 batteries is wrapped. This vapor- and moisture-proof package keeps batteries fresh.

The formerly used gray battery wrapper has been replaced by a plastic-coated jacket. Olin prints the labels and sends them to Arvey Corp., Jersey City, N.J., which applies a top layer of cellulose acetate. The wrappers are then returned to Olin where they are cemented to the battery with a water-proof adhesive. The label's attractive colors add to the battery's appearance.

Every 12 batteries are packed in a vapor-moisture-proof polyethylene envelope

HOW TO CHOOSE YOUR
HEAT RESISTANT GRADE
PHENOLIC MOLDING COMPOUND

What do you make?		Properties you need	DURITE recommends
Heater plugs and similar appliance parts.		Excellent finish and resistance to heat and moisture, improved impact strength.	For general use: DURITE HR-320 For highest heat resistance and impact strength: DURITE HR-330 Black or brown.
Cooking utensil handles, electric iron handles, etc.		Lustrous finish, good heat and moisture resistance.	For improved heat resistance: DURITE HR-300 For good heat resistance with higher impact: DURITE HR-310 For general use: DURITE GP-110 Black or brown.
Diamond wheel cores and similar industrial applications.		Improved impact coupled with good heat resistance.	Improved impact: DURITE HR-330 Black. Highest heat resistance: DURITE HR-340 Black or brown.
Electric waffle base, toaster bases, etc.		Lustrous finish, good heat and moisture resistance.	For general use: DURITE GP-110 For improved heat resistance: DURITE HR-330 For improved heat resistance with higher impact: DURITE HR-340 Black or brown.
Heavy duty switches.		Good heat and moisture resistance with good impact properties.	For general use: DURITE HR-340 Black or brown. For improved impact: DURITE HR-330 Black.

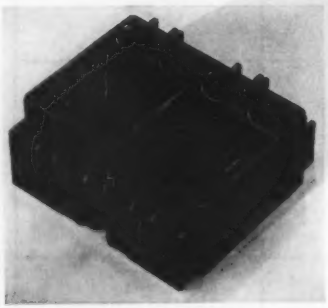
FREE!! Write for catalog, fully describing the wide range of DURITE phenolics for General Purpose, Heat Resistance, Electrical Resistance, Impact Resistance—and made-to-order modifications of standard materials embodying special characteristics to meet your specific requirements. Address:

THE BORDEN COMPANY • CHEMICAL DIVISION
Dept. MP-11, 350 Madison Avenue
New York 17, N. Y.

DURITE
Molding Powders • Bonding Resins • Cements

SQUARE D makes sure of PROFITS when they buy the press

The right molding press selection today will show itself in lower end-product cost to the last day the press is in service.



But the right selection cannot be of press alone . . . you must consider materials, auxiliary equipment, plant layout, mold design and many other factors which control your profits.

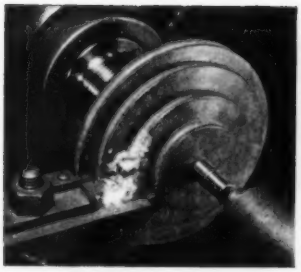
Square D, on Stokes recommendations, is equipped with 50-, 150-, and 300-ton compression and transfer molding presses for the manufacture of many parts, both simple and complex, of the widely used Square D electrical devices. High production, uniform excellence of product, long machine life with virtually uninterrupted service, and negligible maintenance characterize the Stokes installations at Square D.

Stokes has as many years of experience in molding practice as in building the presses with which to mold . . . experience freely available to you through the Stokes Advisory Service.

STOKES

STOKES MAKES
Plastics Molding Presses,
Industrial Tabletting
and Powder Metal Presses,
Pharmaceutical Equipment,
Vacuum Processing Equipment,
High Vacuum Pumps and Gages,
Special Machinery.

F. J. STOKES MACHINE COMPANY, 5934 TABOR ROAD, PHILADELPHIA 20, PA.



Four grooves at a time can be machined in this laminated phenolic pulley blank

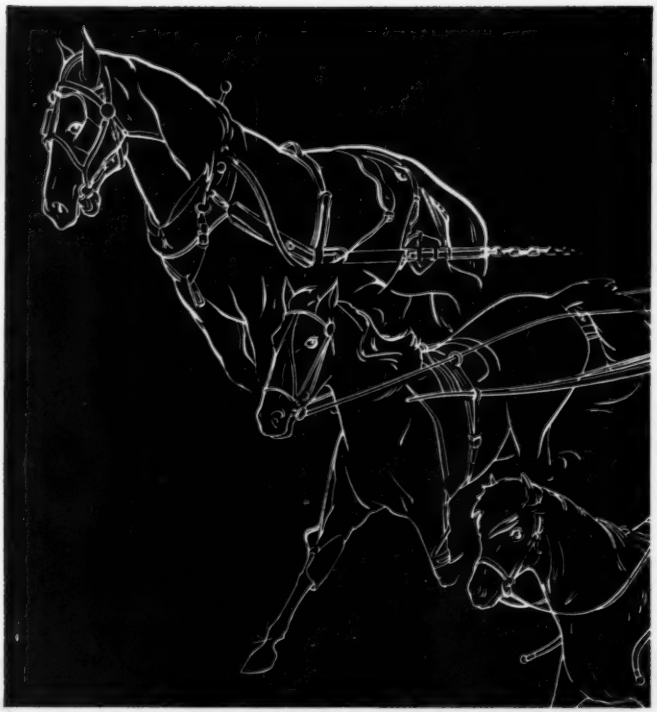
Aluminum Pulleys Replaced

EXTENSIVE savings in machining costs are realized as the result of using laminated phenolic instead of aluminum for pulleys to be incorporated in precision drilling machines. By this change, High Speed Hammer Co., Inc., Rochester, N.Y., has achieved a 66% cost reduction, adapting its machining setup to handle specially formed pulley blanks of the macerated, fabric-base plastic supplied by Synthane Corp., Oaks, Pa., manufacturer and fabricator of laminated and molded plastics.

The major share of this economy can be attributed to the ease of machining; whereas cast aluminum pulleys formerly used required seven operations, the Synthane blanks can now be machined into finished pulleys in only two operations.

As an example of the machinability of the material, the drill press manufacturer has been able to devise a tool with four cutting edges, all permanently secured, to cut four pulley grooves simultaneously and with a single setting. This tool produces grooves with diameters of 1⅞, 2¾, 4⅜16, and 5⅞16 in. on the spindle pulley, and 2⅜, 3^{23}⁄$_{32}$, 5^{7}⁄$_{32}$, and 6 in. on the motor pulley. Molded spindle holes of ½-in. diameter are reamed by the drill press manufacturer to a tolerance of plus 0.0005 and minus 0.0000 inch.

Before the pulleys are shipped to High Speed Hammer, the hubs are drilled and tapped by Synthane to take ¼-in. set screws, and the blanks are lathe-finished all over.



"HORSE SENSE" FOR VINYL MANUFACTURERS

We believe you will agree that draft horses make poor racers—that trotters would mess up a ploughing job. Flexible "equipment" is a must for *maximum* utility. What does this have to do with vinyl manufacturers? Simply to point out that better resins are produced when a ***flexible*** line of stabilizers, each engineered for a specific formulation is used.

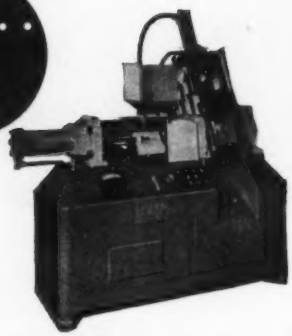
There's no doubt about it! You'll be happier with the final result when you select stabilizers with an eye to the formulation of individual resins and plasticizers. Ferro's knowledge of stabilizer performance can help you. Our background records the solution of unusual problems for some of the largest producers of vinyls. As a result of intensive work in this field, experience indicates that stabilizers of single metals, used in combination, produce optimum activity. Ferro's Stabilizers of Barium, Cadmium, Lead or Stabilizers of Pure Organics or Phosphates are worthy of your investigation. Like more information?

FERRO CHEMICAL CORPORATION
BEDFORD, OHIO

A COMPLETE LINE OF... VINYL STABILIZERS • METALLIC SOAPS • DISPERSING AGENTS • SURFACE ACTIVE AGENTS • DRIERS • COBALT COMPOUNDS

GET MORE PERFECT SHOTS PER HOUR . . .
with a MOSLO
3 Ounce Universal *Minijector*

Completely Automatic INJECTION MOLDING MACHINE



Plastic molders everywhere have discovered there is nothing like a Moslo Universal Minijector for cutting injection molding costs and increasing production. All thermoplastics including vinyls and Nylon are molded fast and smoothly on a Minijector.

We guarantee the production ratings and invite you to compare our specifications. See for yourself that a Moslo Minijector is the best buy in injection molding machines.

Check these outstanding features

1. Completely automatic.
2. Pushbutton controls.
3. Stainless steel, torpedoless cylinder, Patents Pending.
4. All hydraulic.
5. Universal mold-clamp assembly (Operates vertically or horizontally).
6. Quick mold changing.
7. Simple maintenance.
8. Greater versatility.
9. Plasticizing capacity per hour — 35 pounds.
10. Mold casting area — 36 square inches.
11. Maximum injection pressure — 16250 p.s.i.

The Complete Moslo Line Includes:

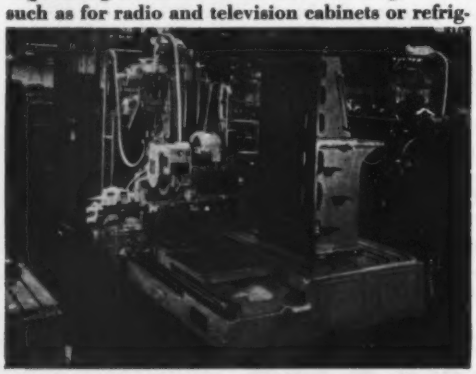
- The Moslo ¾ ounce hydraulic or hand operated Minijector.
- The Moslo 3 and 4 ounce Universal Minijector.
- The Moslo Duplimatic Minijector.
- The Moslo No. 60 Plastic Granulator.

Get the complete story, write today for information on the Moslo Universal Minijector and the Moslo Minijector line.

MOSLO MACHINERY COMPANY • 2443 Prospect Ave., Cleveland 15, Ohio

NOW WE CAN DUPLICATE
CAVITIES AND CORES
UP TO 36" x 60" x 18" DEEP

One of the largest of its kind, our new Keller duplicating machine enables us to cut huge molds such as for radio and television cabinets or refrig-



eration parts. The shape of the master form is accurately and rapidly reproduced in the new mold through automatic electrical controls.

For estimates on all types of molds, consult the

NEWARK DIE COMPANY
22 SCOTT STREET • NEWARK, NEW JERSEY

SUMP TYPE (cutaway)

NOW OVER 175
Manufacturers Make
MARVEL SYNCLINAL FILTERS

LINE TYPE (cutaway)

Their O.E.M. Choice
For HYDRAULIC EQUIPMENT
where oil MUST BE CLEAN

EFFICIENCY—Marvel Synclinal Filters give more filtering area than like size circular units. Preferred by maintenance men because larger filtering area extends periods of operation between cleanings.

SIMPLICITY—Marvel Synclinal Filters may be disassembled, cleaned and reassembled in minutes. A single handnut releases the line model housing without disturbing pipe-fittings.

ADAPTABILITY—Marvel Synclinal Filters operate at full efficiency in any position and can be installed at any angle convenient to your machine. Wire mesh sizes from 30 to 200 available. Individual capacities of from 5 to 50 gpm. and greater capacities are obtainable by multiple installations.

For efficient filtration of liquids in all HYDRAULIC or LOW PRESSURE circulating systems Marvel has your answer. Write for catalogs 104 and 202.

MARVEL ENGINEERING COMPANY
625 W. Jackson Blvd. Chicago 6, Ill.

Injection Molded Santa Claus

AN illuminated outdoor Christmas decoration of a size previously possible only by fabricating sheet stock is now being injection molded of styrene for Noma Electric Corp., New York, N.Y., by Pro-phy-lac-tic Brush Co., Prolon Plastics Div., Florence, Mass. The molded piece measures 30 in. from the feet to the top of the head and is approximately 7 in. in depth. It weighs 36 ounces.

The mold was made by Eagle Tool & Machine Co., Newark, N.J., using Samson II steel, made by The Carpenter Steel Co., Reading, Pa.

The piece is center gated with a sprue opening in the cavity of the mold. Six mounting bosses having molded-in holes are incorporated. A flat piece of die-cut electrically wired Masonite is assembled to the back of the Santa Claus by means of Parker-Kalon self-tapping screws. The light sockets are mounted on the Masonite.

Noma completes the decoration of this Santa Claus by spraying seven different colors using individual electro-formed masks for each color. The cheeks are hand colored. The force plug of the mold produces a mat surface in the plastic. The combination of this surface and the paint, which is all applied from the back or inside, makes Santa's clothing appear to be produced of velvet or velour.

Rich, vari-colored effect is achieved in molded styrene outdoor Santa Claus

ACCURATE

DEPENDABLE

UNIFORM

CUSTOM COMPOUNDING

...of THERMO-PLASTICS

IF YOU REQUIRE:

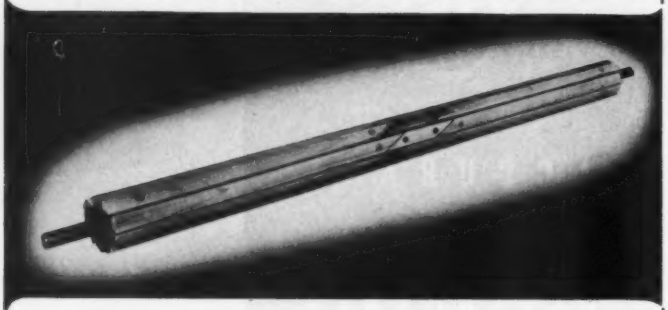
- Granulated formulations
- Record preforms
- Accurate color matching
- Custom production of experimental quantities
- OR — if you have reclaimed material you want compounded

Wire, Write or Call

Premier Thermo-Plastics Co.

908 SOUTH SEVENTH STREET • LOUISVILLE 1, KENTUCKY

STOPS FILM FROM WRINKLING!



Install Progressive Anti-Wrinkle Slat Expanders at strategic spots along your film processing line and watch those wrinkles disappear! You'll find that your equipment (embossers, tubers, batchers and the like) run faster; that your rolled film is tighter and smoother and neater than ever before. You can get Progressive Slat Expanders in widths to fit your present converting equipment. Write today for complete details and prices.

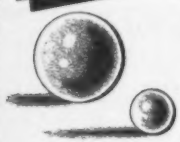
Progressive machine co., inc.

Specialists in Plastic Film Handling Equipment

198-202 East 25th Street — Paterson 4, N. J.

Tubing Machines • Continuous Hammers & Sealers • Film Cut-Off Reels

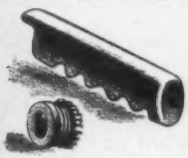
ANY FABRICATION JOB
any plastic material
see CRYSTAL PLASTICS



Plastic Balls up to 2" diam.

Centerless Grinding of all plastics

Thread Tapping accurate, high speed



Precision Machining to specifications

Vacuum Forming of acrylic plastics

Die Cutting and assembly

for all your requirements, call

CRYSTAL PLASTICS, INC.

232-252 Taaffe Place, Brooklyn 5, N. Y. • Phone: ST 9-4002-4

Materials

(*Continued from pp. 55-64*)

1950. Laminating plants were operating practically around the clock, and a promise of six-weeks delivery was a minimum. Decorative laminates continued to make gains, but industrial laminates are still the bulk of the business. There have been several large plant additions made by operating companies since 1946, but information on the size of this increase is not presently available.

Miscellaneous phenolic resins for use in brake linings, grinding wheels, rock-wool binder, cast resins, wood waste, and foundry molds or cores showed almost a 20% increase in 1950. The two newest—wood waste and foundry core resins—are reported to account for about 7% of the total today.

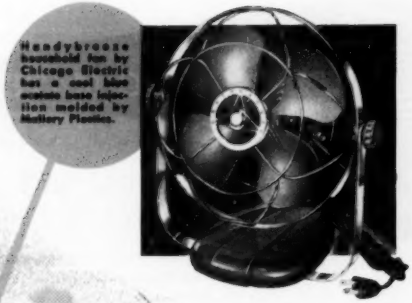
Urea and Melamine

Urea and melamine resins took a great leap forward in 1950. The molding powder and laminating resins gained more than 45% over 1949 despite a long strike in a major producer's plant. Of the near 70-million-pound total, well over 50 million pounds is estimated to be urea which is certainly a big increase from the approximately 30 million pounds of former years. Urea crystal, the material from which the plastic is made, became scarce toward the end of the year.

Urea crystal is in great demand not only for fertilizer, cattle feed, and plastics, but two new products—ammoniated tooth paste and a liquid fertilizer for spraying on trees—made great inroads on supply last year. However, it is not anticipated that there will be a shortage in 1951 short of a most unusual demand. Allied Chemical & Dye Corp. has just come in with an Ohio plant which will manufacture not less than 40 thousand tons of urea crystal annually to be sold through its affiliate, The Barrett Division. It has been estimated in the trade that Du Pont, the only other manufacturer, can produce 60 thousand tons a year.

Melamine was tight for all the last quarter of 1950. Demand for laminating resin used in decorative laminates, and phenomenal acceptance of melamine molded dishware, were probably the leading factors in this situation, but there was increased demand

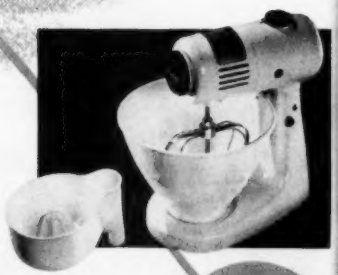
Electric ice cream freezer by Chicago Electric. Freezer bucket of white acetate injection molded by Mallory Plastics.



Handybreeze household fan by Chicago Electric has a cool blue acetate base injection molded by Mallory Plastics.

AT HOME WITH MALLORY PLASTIC PARTS

Formerly Plastic Molders, Inc. (Chicago)



Electric Mixer by Dirtman Electric uses mixing bowl and juicer injection molded of white polystyrene by Mallory Plastics.

Melle-Ware, the new plastic dinnerware compression molded of Melmac for beauty and durability. Molded and marketed by Mallory Plastics.

Very few home owners know Mallory Plastics as such but hundreds and thousands of them are today enjoying better living through many household appliances and equipment for which Mallory Plastics supply parts. The manufacturers of these appliances long ago recognized the importance of the precision molding techniques, engineering assistance, modern equipment and prompt deliveries of Mallory plastic parts. Their engineering, production and purchasing departments always consult Mallory Plastics when a new product is being readied for the market.

Why not take your cue from their steady patronage and have your next job for plastic parts produced by P. R. Mallory Plastics, Inc.

Facilities include compression presses from 100 to 750 tons, transfer presses from 100 to 400 tons, injection presses from 8 oz. to 32 oz. and complete service for fabricating, assembling and painting.

MALLORY

WRITE OR PHONE: CHICAGO
PAlisade 5-6750

Representatives in Principal Cities

APPROVED MOLDED PRODUCTS

P. R. MALLORY PLASTICS, INC.

3670 MILWAUKEE AVENUE, CHICAGO 41, ILLINOIS

Compression and Injection Molders

MOLDINGS UP TO 25 LBS.

PHENOPREG MATERIALS

for LAMINATING and MOLDING
high pressure • low pressure

PHENOPREG materials represent a wide variety of resin impregnated materials for laminating and molding. They offer unlimited possibilities for the production of decorative laminates, all grades of industrial laminates, molded laminates, structural assemblies, reinforcement of molding compounds and many specialized products.

PHENOPREG materials are treated with phenolic, melamine, diallyl phthalate, BCM and polystyrene resins.

PHENOPREG materials are resin impregnated fabrics, such as duck and linen, papers, including decorative, Kraft, Resin X Crepe and a number of specialized items, Fiberglas cloth and Fiberglas mat.

We can supply stock grades or specialized material to fit any laminating applications. Ask for a sales engineer to assist you with your technical problems. Write TODAY to

FABRICON PRODUCTS, INC.
PLASTICS DIVISION

1721 Pleasant Avenue • River Rouge 18, Michigan • VInewood 1-8200
Sales Offices: New York, Chicago
Canadian Representative: Plastic Supply Company: Montreal, Toronto

SPECIAL SMALL EQUIPMENT
for plastic, optical, celluloid and allied industries

This Toggle Press rated at 4 tons with 100 lbs. of air. Made also as Foot Toggle. These presses, and several other sizes and styles of Hand Lever Presses, handle economically embossing, drawing, and degating jobs in plastic manufacturing concerns. Prompt delivery.

Specialists
in Injection Mold Making
also Transfer
and Compression Molds

STANDARD TOOL CO.
83 WATER STREET, LEOMINSTER, MASS.
Outfitters to Plastics Mfrs. Since 1911

OMNI PRODUCTS CORP., Export Distributors, New York, N. Y.

across the board from electrical applications to adhesives. Melamine is also used in the kraft paper used for V-Board that the Armed Services likes for overseas shipments, and it goes into most other types of wet-strength paper used for maps, blue prints, and the like. There was an increased demand for all these products almost immediately following Korea. A temporary power shortage in Canada, where the cyanamide needed for melamine is produced, created a problem for a short period, but addition of auxiliary equipment overcame that difficulty, at least for now.

It is expected that the melamine tightness will loosen up in February when new facilities are due to start operation, but it is a top material for various military and naval products. It may continue scarce for the duration of the emergency.

Vinyl Production

The story for vinyls in 1950 is one of almost unbelievably increased usage. If everything in this category —including plasticizer, filler, and all types of vinyl including vinyl chloride and copolymers, butyral, formal, acetate, alcohol, and saran—were added together, the total consumed in 1950 would be over 500 million pounds. The Tariff Commission figures as given in Table C on p. 60 don't give all the figures for compound. Part of the figures are based on solid resin. They do give all the various types of vinyls, but it would take a statistician with the patience of Job to sort out all the various types represented. Therefore we have again attempted to break out the vinyl chloride and vinyl chloride copolymers with the help of various producers who are handling these materials. Since the chlorides are such a large portion of the total, it seems fitting that they should be sorted out for special attention. The estimate of around 280 million pounds of solid resin used in 1950 is deemed conservative by most authorities in the field, yet it is almost 100 million pounds more than a similar estimate made for 1949. Despite this unprecedented increase, vinyl users were bitterly complaining of shortages all through the second half of 1950.

As shown in Table D, p. 64, there were sizeable increases in every end use. Film under 10 gage continued its lead as largest volume user with the

(*Continued on p. 145*)

SURE CURE FOR METAL SHORTAGES

Here is a practical way to avoid delays in production due to metal shortages. Substitute plastics for items like nameplates which can be fabricated advantageously to your exact specifications.

Sillcocks-Miller specialists offer the experience and facilities to develop and produce quality nameplates and other parts for which plastics are a practical substitute material.

It will pay you to write for details or submit specifications for quotation.

The SILLCOCKS-MILLER Company

Pioneers in Plastic Fabrication since 1910

10 W. Parker Ave., Maplewood N. J.

PLASTIC MOLDS

The above mold, weighing 5 tons, measuring 62" x 32" x 14", was made for the Panelyte Division of St. Regis Paper Company.

Send for our bulletin on your company letterhead.

EAGLE TOOL AND MACHINE COMPANY
37-39 FREEMAN ST.,
NEWARK 5, N. J.
TELEPHONES: MARKET 3-1572-73

SINCE 1918

The KEY to Better Plastics

HARCHEM

HARFLEX

TRADE MARK

PLASTICIZERS

The quality of a plastic is no better than the quality of the plasticizer used therein.

You can be sure of highest quality and consistent performance with HARFLEX PLASTICIZERS.

PHTHALATES ADIPATES
HARFLEX 500®
SEBACATES

THE KEY TO HARCHEM BETTER PLASTICS

HARDESTY CHEMICAL COMPANY, INC.
41 EAST 42nd ST. NEW YORK 17, N. Y.
MANUFACTURERS OF SEBACIC ACID

YARDLEY

EXTRUDED PLASTIC GASKETS

for every purpose!

- ★ METAL BUILDINGS
- ★ REFRIGERATORS
- ★ APPLIANCES
- ★ STORM WINDOWS
- ★ DRY GLAZING

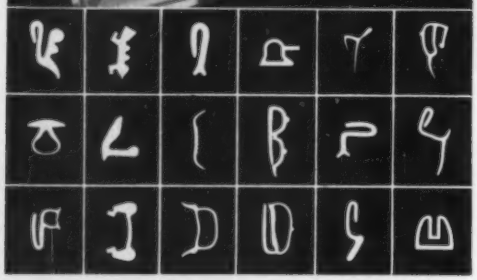
Yardley has successfully solved the problem of permanently sealing outside weather joints on panels, corners and windows of nationally-known metal houses and commercial buildings.

The cross section here shown is a vinyl dry glazing especially designed for use in aluminum primary windows.

If you use gaskets of any kind, consult Yardley. Our engineers have perfected modern production techniques that can save you time and money on exactly the right strip for your specific needs.

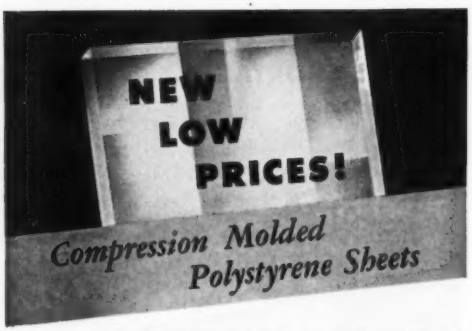
Depend on us for pin-point accuracy in design and tolerances that assures consistent uniformity. We extrude and fabricate any thermo-plastic material.

There's an experienced Yardley representative near you. We will send him promptly.



A Few Typical Cross Sections

YARDLEY
PLASTICS CO.
142 Parsons Ave., Columbus 15, Ohio AD. 9315



In order to move them promptly, extremely attractive prices are available on Acadia Synthetic Products compression molded polystyrene sheets in all thicknesses from ⅛" to 1". These sheets have properties superior to those fabricated by other methods—no shrinkage at normal temperatures—better heat resistance. New low prices are also available on Saran*, Tenite, Vinylite and other thermoplastic sheets. Wire or write for quotations. (*Dow Chemical Co.)

DIVISION WESTERN FELT WORKS
Largest Independent Manufacturers and Cutters of Felt
4035-4117 Ogden Avenue, Chicago 23, Illinois

ACADIA *Synthetic* **PRODUCTS**
Processors of Synthetic Rubber and Plastics • Sheets Extrusions • Molded Parts
LARGEST INDEPENDENT MANUFACTURERS AND CUTTERS OF FELT

Surface

PYROMETERS

for every purpose

The routine use of CAMBRIDGE Surface Pyrometers takes the guesswork out of temperature determination in many industries. The CAMBRIDGE is accurate, dependable, rugged, quick-acting and easy to use. The Roll Model is for checking surface temperatures of moving rolls. The Needle Model is for insertion into materials in a plastic or semi-plastic state for batch temperature determination. The Mold Model is for checking surface temperatures of mold cavities and surfaces of almost any contour.

Send for Bulletin 1945A.

CAMBRIDGE INSTRUMENT CO., INC.
3711 Grand Central Terminal
New York 17, N. Y.

CAMBRIDGE
PIONEER MANUFACTURERS OF
PRECISION INSTRUMENTS

Moisture Indicators and Recorders • Physical Testing Instruments • Laboratory Instruments for A. C. & D. C. • Galvanometers Engineering Instruments • Gas Analysis Equipment • Physiological Instruments and many other Mechanical and Electrical Instruments

principal end uses continuing to be drapes, shower curtains, raincoats, and tablecloths. An even greater percentage of growth was in unsupported sheeting. The increase was generally credited to more volume in the automotive upholstery field, a more extended use of upholstery to include different styles in chairs, and considerably more use of vinyl in luggage.

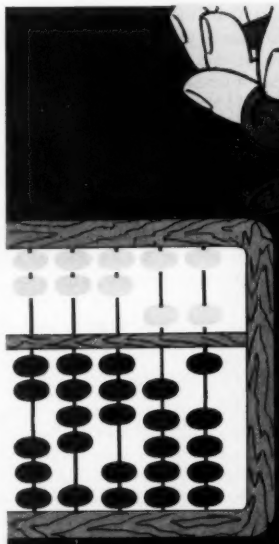
Coated Fabric

The fabric coating increase included an upsurge in the use of plastisols and organosols for spread coating. Perhaps 60% of this material is spread coated and is edging in on the calendering field. Practically all the materials with a 7- or 8-mil coat are now spread coated, as are even some of the thicker materials. Fabric-backed upholstery for the automotive trade is generally calendered because it is more economical in long runs, but such items as automotive visors, kick plates, and trim may be spread coated, since they do not require heavy sheet.

The vinyl molding and extrusion figure is difficult to estimate because of widespread variations in applications. A compromise figure based on the estimate of producers comes out like this: wire coating, 40 million pounds; garden hose and other extrusions plus elastomeric molding, 10 million pounds. That would leave 17 million pounds for phonograph records, but manufacturers of another resin used for records insists that close to 30 million pounds of vinyl were used for records in 1950.

There is also an inconsistency between the figure in Table D and the over-all figure for molding in the Tariff Commission report, where 106 million pounds is reported. This latter figure includes saran and a few miscellaneous items, but the difference of 40 million pounds between these two figures is believed too high. There are several million pounds of vinyl floating around in there somewhere that won't come out to be properly counted.

The miscellaneous figure in Table D includes exports which are estimated at between 12 and 15 million pounds of resin; Tariff Commission figures show close to 20 million pounds, but they are cluttered up with plasticized compound as well as some film and sheet. Others in miscellaneous are some types of flooring



You get every penny's worth of **BLACK** with Cabot's **MONARCH 71**

Every plastics manufacturer who wants outstanding jetness at minimum cost should examine Cabot's MONARCH 71. We recommend this high-color, medium-priced channel carbon black for trial in all plastics products, by all plastics manufacturers.

MONARCH 71, at loadings equivalent to those of much higher-color blacks, provides easy dispersion, and gives maximum softness and flexibility to the plastics compounds in which it is incorporated. You will also find that MONARCH 71 can be used to produce just the right amount of electrical conductivity for electrostatic spraying.

No other black in its price range can equal MONARCH 71. When you want the most exceptional black on the market for the least amount of money, order MONARCH 71—the best general purpose plastics black you can find anywhere.

Monarch-71

CABOT

GODFREY L. CABOT, INC.

77 FRANKLIN STREET, BOSTON 10, MASSACHUSETTS

That custom tailored look

No man looks as well in a ready-made suit as in a suit cut to his exact measurements. Your products, too, will look better if your moulding or coating requirements are met *exactly* by a Stanley custom-made vinyl compound. Stanley chemists with years of experience in the vinyl field can make your products look their best . . . longer.

And what about the products still on your drawing boards? A Stanley vinyl compound created especially for that new product application can make today's idea tomorrow's money-maker.

Ask about Stanley Vinyl Inks for rotogravure and silk screen printing, Stanley Plastisols for fabric or paper coating, Stanley Organosols for moulding or coating. Write today to the

Stanley Chemical Company, East Berlin, Connecticut.

Industrial Coatings

STANLEY CHEMICAL

LACQUERS · JAPANS · SYNTHETICS · ENAMELS

resins (part of the flooring material is in sheet); protective coatings; adhesives; and other unclassified material, a small portion of which may belong in the defined categories preceding it in the table. Miscellaneous is always a good place to hide things if the manufacturer doesn't want his competitor to know what's going on.

Despite this uncertainty in the last two categories of Table D, the overall figure of over 280 million pounds is considered accurate within less than a 5% error, and for an indication of trend gives a good idea of what happened to vinyls in 1950.

The Chlorine Shortage

The increase in vinyl use came along despite a shortage in chlorine caused partly by a long strike but primarily by a great demand for chlorine. The situation for chlorine in 1951 looks no better than in 1950, but B. F. Goodrich Chemical Co., one of the two major producers of vinyl, expects to have another plant producing vinyl in mid-year. Goodyear is planning a large expansion, and other producers all expect to increase vinyl production despite the chlorine problem.

It is difficult to talk manufacturers into building more chlorine plants because it is a co-product with caustic soda and, although caustic soda is now tight, it is frequently a drug on the market in normal times. In fact, there was an excess of caustic last June just before the strike. Most manufacturers of chlorine use all their own output, so that any producer of vinyl must ordinarily be assured of a guaranteed source before he can expect to increase his production of vinyl. When the alkali strike was in effect last summer, several of the smaller-volume vinyl producers were completely cut off from a supply of chlorine because there was none available from the non-striking plants who used their own production or were on contract to supply other users.

Plasticizers

Another problem that might interfere with use of more vinyl is a shortage of plasticizer. Practically every chemical needed for them is in exceedingly short supply. The list is headed by naphthalene, a coal tar acid derivative, and includes alcohol, phthalic anhydride, styrene for polyester plasticizers, etc. A rough estimate of plasticizers produced for vinyl in 1950 would be:

Phthalate type	72,000,000
Phosphate type	18,000,000
Polyester type	7,000,000
Adipate type	4,000,000
Others, including sebacate and fatty acid types	9,000,000
Total	110,000,000

It is difficult to understand how the industry got along with that small an amount without using some undesirable materials that would lower the quality of the finished product. Where they will get more in 1951 is still a question. It is reported that more isooctyl alcohol will be made available soon for use in phthalates and more phthalic anhydride may be produced from petroleum, but whether or not in the needed quantities is a question.

The vinyl industry now has a reported capacity of over 370 million pounds, but how much of it can be utilized in 1951 depends on raw materials and manpower.

And, of course, there is always the question of whether or not demand will continue at present levels. There has been some jitteriness over the supposedly large inventories of film and sheeting now in dealers' hands. However, most calenderers are running full blast—or as full as materials will permit—in the expectation that winter buying by the consumer will wipe out all surpluses. There is little cause for concern of overstocked inventories in other vinyl categories.

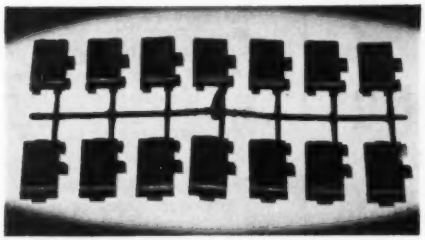
Possible governmental demand for vinyl is today an unknown factor. Vinyl for wire coating, coated fabrics for nylon ponchos, and duck for tarpaulins or Arctic tents are already on the list.

If the military doesn't take too much of the vinyl supply, processors may turn to it for many applications when other plastics are not available.

Today's demand is just about as much in advance of supply as any other plastic, but whether or not that heavy demand will continue can only be a guess. Producers are guessing that demand will continue and, despite all shortage problems involved, think that maybe they can make 20% more vinyl in 1951 than in 1950.—END

(A limited number of reprints have been made of the foregoing analysis of the materials situation. Copies are available on request.)

QUALITY DOESN'T COST—IT PAYS!



MOLDS BY FORECAST CREATIONS

The ABC in PLASTICS MOLDS means
America's Best Castings —
Fabricated exclusively by MANCO
in *BERYLLIUM COPPER.*

This camera was molded with perfect fidelity using cores and cavities of TRU-CAST Beryllium copper.

Prompt service—no increase in price.

Write for our new Brochure

BERYLLIUM COPPER AT ITS BEST
TRU-CAST by MANCO

MANCO PRODUCTS CO.
2401-2409 Schaefer Road
Melvindale • Michigan

---

drop 'em in the hopper

they
COME OUT PRINTED

by this **APEX AUTOMATIC**

Print one or two color decorations, trade marks, illustrations on almost any surface—plastic, glass, metal, wood, cardboard, etc. Automatic, continuous. No skill required to operate! 2500 pieces per hour. Special machines to order.

Send for illustrated bulletin and samples of work!

One-Color — Model C-31, $910
One or Two Colors — Model C-32, $960

APEX

APEX MACHINE MANUFACTURING CORP.
53 East 10th St. • New York 3, N.Y.
Largest and Oldest Mfrs. of Multi-Color Ink and Hot Stamping Machines

---

Plastics Scrap

- ***bought***
- ***sold***
- ***reworked***

Custom regrinding, compounding and coloring

cellulose acetate
butyrate
polystyrene
methyl methacrylate
polyethylene
polyvinyl resins
ethyl cellulose
nylon

VINYL AND POLYETHYLENE FOR EXTRUSION • INJECTION • CALENDERING

A. BAMBERGER
CORPORATION
703 Bedford Avenue, Brooklyn 6, N. Y.
Phone: MAin 5-7450
CABLE: CHEMPROD BROOKLYN

Engraving

PROFILING
VERTICAL
MILLING

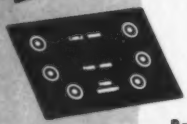
Displays

Dies

Here is the most versatile machine for any plant. . . . So simple to operate by unskilled labor.

Signs

NEW HERMES
Engravograph
TRADE MARK



Panels

This heavy duty bench type model covers a larger engraving area than any other machine of its kind.

Name Plates

PORTABLE ENGRAVER described in Folder EM20
HEAVY DUTY ENGRAVER described in Folder H20

NEW HERMES, Inc.

13-19 UNIVERSITY PL. • NEW YORK 3

World's Largest Manufacturer of Portable Engraving Machines

Why Benzol?

(*Continued from p. 61*)

future emergency or stockpile program. Toluol could be used instead, but toluol is needed for explosives. Regardless of the situation in Avgas, other products demanding benzol are almost constantly on the increase and could soon soak up what is left.

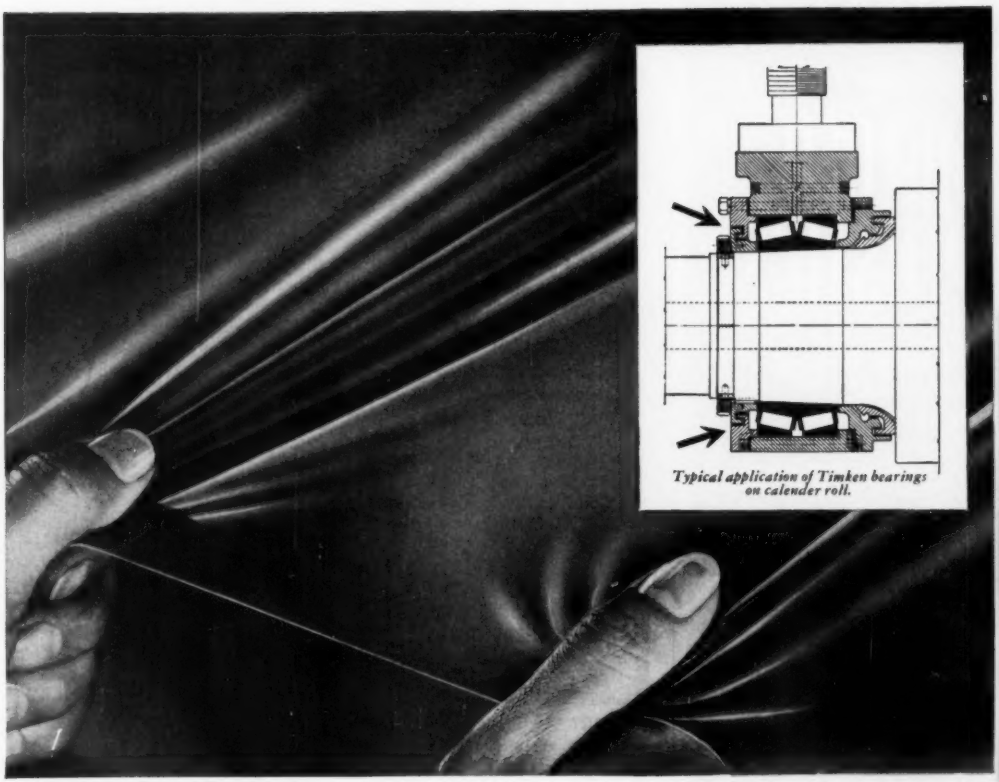
The threatened shortage of benzol in 1950 was largely taken care of by imports. In the first eight months, United States imports of benzol were 4,500,000 gal. from Britain; 3 million from Poland and Czechoslovakia; 800,000 from Canada. Obviously at least some of that importation cannot be relied upon in time of peril. Contracts have been made for about 45 million gal. to be imported from the United Kingdom over a year's time, starting last summer. Benzol users assert that this imported material plus domestic production will be enough to assure a sufficient supply of benzol for the facilities available to handle it in 1951—provided, of course, that there is no all-out war. European benzol is motor benzol and sells at a premium. It must be refined here and returns about 700,000 gal. of usable benzol from one million gal. of unrefined. These added costs must be reflected in an increased price of polystyrene plastic.

Petroleum companies do not seem eager to enter the business. Expensive facilities have to be built for deriving benzol from petroleum. Then, too, there is always the question of how much benzol will be required in a peacetime synthetic rubber program. If it is severely cut, the market for benzol is considerably diminished.

Petroleum benzol will be made available in 1951 from other than the two plants now in business, but the total quantity is not likely to exceed 15 or 20 million more gal. than that now available from petroleum.

The best bet for long-term benzol availability seems to be either from coal hydrogenation or oil-shale fuel plants. The government is experimenting in those fields with a fairly promising outlook in view, but consummation is a long time off and only at what seems like an almost prohibitive cost. Reports are that one private chemical company may bring in a hydrogenation plant in the fairly near future.—END

New way to get uniform thickness and color in your plastic sheets



Typical application of Timken bearings on calender roll.

NOW you can get *consistent* gage and color in your plastic sheets. Now you can cut losses due to rejects and too-thick sheets.

The secret is in the precision of your calenders — the kind of *extreme* precision you get when the calender rolls are mounted on *Timken® tapered roller bearings* (see sketch above).

Unlike plain bearings, Timken bearings can be adjusted very precisely at installation to allow for roll expansion caused by heat. Vertical roll movement is held to a minimum, calender precision is maintained!

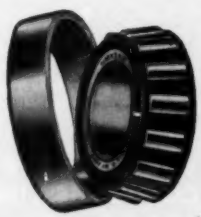
What's more, this precision *lasts.* Timken bearings provide greater roll rigidity because their tapered construction takes any combination of radial and thrust loads. Because they carry the greatest loads —thanks to line contact between rolls and races.

Timken bearings on your calenders, mills, refiners and banbury mixers can help you improve the quality of your plastics, cut losses, and reduce maintenance costs. Get full details. Write to The Timken Roller Bearing Company, Canton 6, O. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ▯ AND THRUST →▯← LOADS OR ANY COMBINATION

Consult Waterbury for MOLDED PLASTICS

Creative Service in Product Development

Research, Design, Engineering.
Compression, Transfer, High Speed, Injection and Low Pressure Molding.
Over a Century of Fine Tool and Mold Work.
Finishing, Assembling.

PRODUCERS OF PLASTIC CONTAINERS FOR MANY WORLD FAMED PRODUCTS

SALES OFFICES

NEW YORK 17, N.Y.
17 East 42nd St.
BOSTON 11, MASS.
99 Chauncy St.
CHICAGO 6, ILL.
223 W. Jackson Blvd.
PHILADELPHIA 3, PA.
117 South 17th St.
ROCHESTER 6, N.Y.
Leon W. Sage, Inc.
333 University Ave.
DETROIT 7, MICH.
Wm. Robert Wilson & Associates
6460 Kercheval Ave.

Our technical staff will gladly confer with you.

Write for Waterbury Plastics Catalog "M"

WATERBURY COMPANIES, INC.
Waterbury, Conn.

Engineering

(*Continued from pp. 81-92*)

It is necessary to inject the resin into the lay-up after the mold is closed. Le Conte solved this problem neatly by developing a separate resin pot which was connected to a small opening in the mold by a hose. A second connection was made on the resin pot so that air pressure could be exerted against the resin. In addition, a vacuum connection was made on the mold.

With such a setup, the resin is transferred from the pot into the mold by drawing a vacuum on the mold and exerting air pressure on the resin in the pot at the same time. Thus the entire mold is filled out with resin, and no difficulty is encountered with starved spots caused by trapped air. As soon as the mold is completely filled out, the vacuum and resin pot connections are broken and the mold placed in an air circulating oven for cure. After molding, the housing is placed on a jig, and a sawing operation is used to finish the parting line.

FOUNDRY MOLDS

EXPERTS estimate that the production of phenolic-sand molds and cores for foundry practice[14] will, in the future, consume a greater tonnage of phenolic resin than any other single application in commercial use today.

Basic work on this process was done in Germany during World War II. The so-called "C" process of precision molding, invented by Johann Croning and developed by Croning & Co., consists of producing a comparatively thin shell-like metal-casting mold by applying a mixture of sand and a phenolic binder to a hot metal pattern and curing the layer of material. Many foundries, as well as all of the larger manufacturers of phenolic materials, have since been hard at work developing and refining the materials and technique of this sand-mold method.

It has been announced that applications for patents applying to various aspects of this process have been made by Crown Casting Associates, Boston, Mass.

Reports on experimental work done to date indicate that the "C" method has the following advantages:

Molds are dry and porous, permitting quick elimination of gases; no back pressure is built up.

Very accurate dimensions are obtained; tolerances of a few thousandths of an inch are possible.

Sections as thin as 0.010 in. can be cast accurately.

Very smooth surfaces can be obtained on cast pieces, and considerable machining is eliminated.

Fewer surface defects and smoother surfaces result in stronger castings, allowing thinner sections.

Uniformity of resin-sand mix in molds eliminates rejects caused by variations in moisture and clay content in usual molding sand.

Cleaning of castings is minimized, and shot blasting is practically eliminated.

Some parts which formerly had to be made in two or more pieces to allow for machining may be made in one piece because of the reduction in the amount of machining needed.

Saving of metal by elimination of risers, by more efficient coring, etc., results in a much higher yield from metal used than customary.

Contamination of surfaces of casting is held to a minimum.

Inexpensive equipment is used in making the molds.

More molds per day can be made with the same labor and space than by usual methods.

Handling of sand is greatly reduced; only about 5% of the usual amount of sand is used.

Handling and storage of flasks are eliminated.

Unskilled labor can be used for making the precision molds.

Molds have no affinity for water and hence may be stored indefinitely.

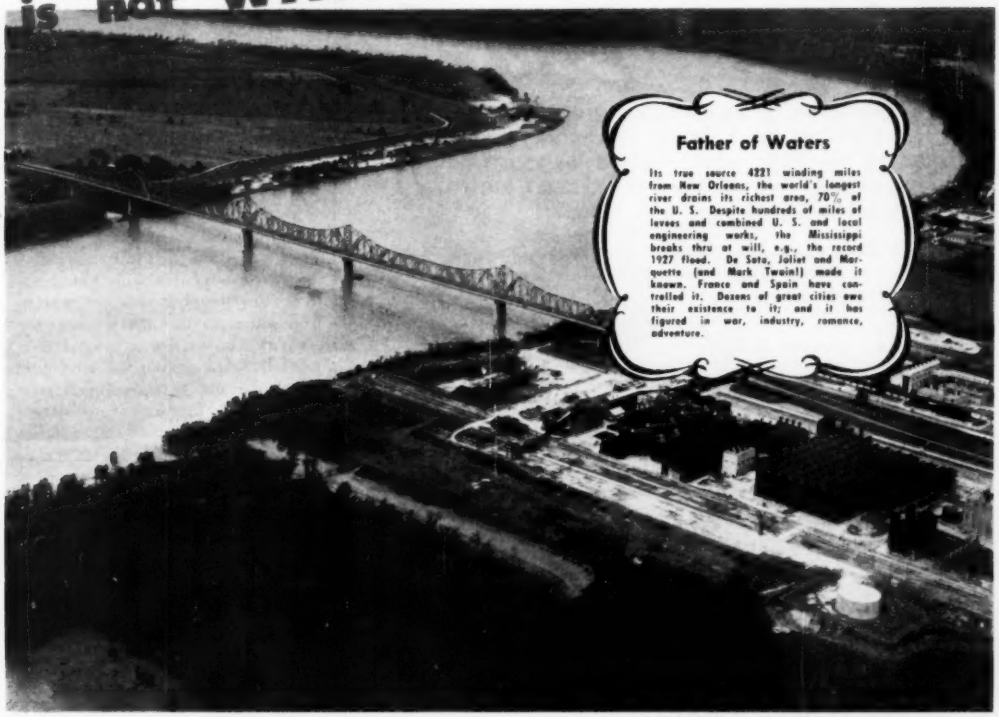
Cores being hollow and dry allow quick escape of gases; also, they collapse readily.

More castings per unit of floor space can be poured at one time because molds are smaller and are poured in upright position.

Despite all the advantages, present experimental work with this process indicates that it will not be economical for use in producing very large castings. Its greatest use ap-

[14] MODERN PLASTICS, July, 1950, p. 79.

PLASTIC SCRAP is not WASTE!


Father of Waters
Its true source 4221 winding miles from New Orleans, the world's longest river drains its richest area, 70% of the U. S. Despite hundreds of miles of levees and combined U. S. and local engineering works, the Mississippi breaks thru at will, e.g., the record 1927 flood. De Soto, Joliet and Marquette (and Mark Twain!) made it known. France and Spain have controlled it. Dozens of great cities owe their existence to it; and it has figured in war, industry, romance, adventure.

AT BATON ROUGE, LA. (Fairchild Aerial Surveys, Inc., N. Y. C.)

it can FLOW BACK AGAIN

....into your Production!

POLYSTYRENE
CELLULOSE ACETATE
ETHYL CELLULOSE
POLYETHYLENE
BUTYRATE
VINYL
ACRYLIC

GERING has long played the part of Plastics conservationist. We will buy your Thermoplastic scrap, obsolete molding powders, rejects . . . and presto! . . . they are reborn into good molding powders. WE need your scrap. YOU can use our materials.

PHONE • WRITE • CABLE • WIRE

GERING *Products, Inc.*
KENILWORTH NEW JERSEY

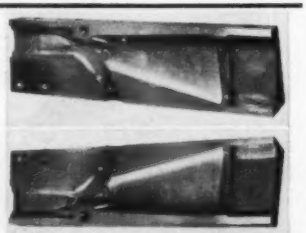
. . . WHY *BETTER* MOLDS FOR PLASTICS

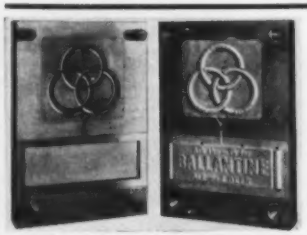
Cost Less!

AN INVESTMENT IN CRAFTSMANSHIP AND ACCURACY WHEN PURCHASING PLASTIC MOLDS *PAYS OFF* CONTINUALLY IN *PRECISION* PLASTIC PRODUCTS — DESIGNED RIGHT, ENGINEERED RIGHT, BUILT RIGHT — A *BETTER* MOLD SAVES *TIME* AND *MONEY!*

PLASTIC GUN STOCK MOLD . . .

An unusual combination of facilities and techniques was required to engrave the hob, hob the knurled hand grip section, and Keller machine the mold cavity. Here, accuracy and craftsmanship paid off in performance.



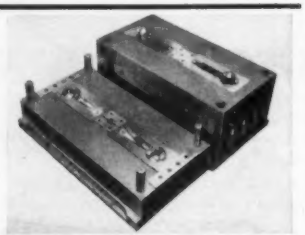


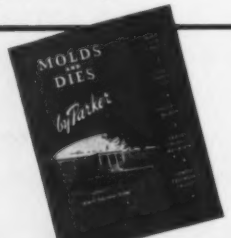
PLASTIC ADVERTISING DISPLAY MOLD . . .

Unique engineering problems were encountered successfully in building this display mold. Note: Raised knurled rings with raced engraving on force. Here, several specialized operations of mold making were combined to produce a *better* mold.

PLASTIC MOLD FOR HAND MICROPHONE

A number of precision molded plastic parts were required to fit perfectly into a microphone assembly. Internal electronic controls with exacting tolerances were housed in this assembly. Here, engineering experience and versatility paid off in performance again.





SEND FOR THE PARKER GREEN BOOK

An excellent reference for better molds for plastics. Now or for future use have the Parker Green Book in your file. Parker invites inquiries and is pleased to quote on your mold needs. No obligation, of course.

THE PARKER STAMP WORKS, INC.
PLASTIC MOLD DIVISION
FRANKLIN AVENUE • HARTFORD, CONNECTICUT
by Parker

pears to be limited to the production of relatively small parts.

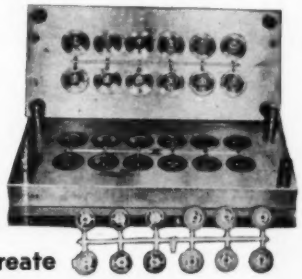
Although each of the companies working on this development—Bakelite Div., Union Carbide and Carbon Corp.; Borden Co., Chemical Div.; Durez Plastics & Chemicals, Inc.; and Monsanto Chemical Co.—vary somewhat in their procedures, the basic process includes the following steps:

A heated metal pattern is secured to the top of an assembly containing a quantity of resin-sand mixture. The assembly is then inverted, causing the resin-sand mixture to fall onto the surface of the heated pattern. The heat from the pattern causes the resin to flow momentarily and then partially cure around the sand next to the pattern. After sufficient time has elapsed to permit a suitable thickness of the resin-sand material to fuse together on the hot mold surface, the mold assembly is returned to an upright position, permitting loose and uncured resin-sand mixture to fall away from the shell. The pattern, with the partially cured shell attached, is then removed and placed in an oven where they remain until the mixture hardens, after which the thin mold is removed from the pattern. The two halves of the mold thus produced are clamped together during the pouring of the metal. The mold is poured in an upright position, taking care to avoid turbulence of the metal, since too much turbulence may remove some of the sand from the mold surface. The quick escape of air and gases eliminates any possibility of back pressure and results in a solid, dense structure comparatively free from porosity and defects.

ALKYD PRESSES

DURING 1950, four different companies—Elmes Engineering Div., American Steel Foundries, Cincinnati, Ohio; F. J. Stokes Machine Co., Philadelphia, Pa.; Baker Bros., Inc., Toledo, Ohio; and The Denison Engineering Co., Columbus, Ohio—placed on the market presses especially designed for high speed molding of alkyd compounds.

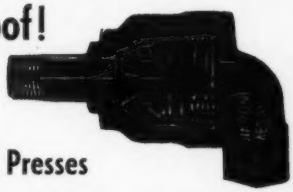
"PRETTY GOOD"
isn't good enough



SAVE TIME and MONEY
by letting us create
Pre-Mold Models
and follow through with
Perfect Production Molds

STRICKER-BRUNHUBER CORP.
Mechanical Developers
19 WEST 24th ST. NEW YORK 10, N. Y.
WAtkins 9-0191

DIAMOND SWING AND BALL JOINTS
are Leak-Proof!



For Plastic and Rubber Molding Presses

Especially constructed to offset expansion and contraction caused by sudden change from high pressure steam to cold water, Diamonds permanently end leaking nuisance. They are recommended to correct misalignment in any hook-up and never require replacement of the entire unit or other expensive parts. Available in sizes from 3/8" to 1¼".

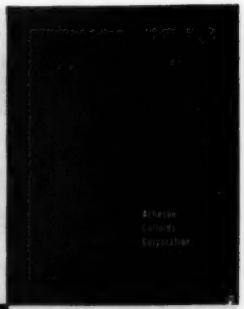
DIAMOND REVOLVING JOINTS

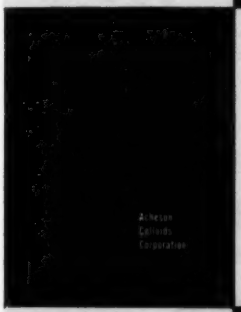
Made for use on mills, mixers or any other steam heated or water cooled rolls, these joints are equipped with special split thrust bearings and end plate, facilitating maintenance and replacement of gaskets and bearings without complete removal of joint from roll. Patented construction prevents leaking. Specially compounded molded gasket lasts 14 months on average in severe service. Sizes from 1" to 2½".

Bulletin and Prices upon request.

DIAMOND METAL PRODUCTS CO.
406 Market Street — St. Louis 2, Mo.

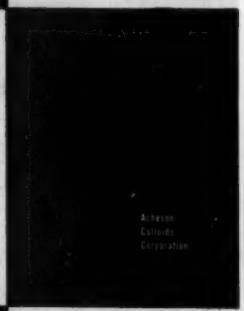
FREE!
"dag" carbon black dispersions booklet ➡

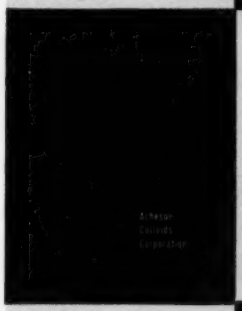




If you are interested in...
the coloring of polystyrene, ethyl cellulose, polyethylene, cellulose acetate molding powders or scrap . . . vinyls or the general pigmentation of resins . . .

You should have...
Acheson Colloids' new "BLACKS" booklet. It's FREE!
Gives a brief explanation of 7 standard "dag" carbon black dispersions.
Write today for your copy.





Acheson Colloids is equipped to do custom disintegrating, dispersing, and stabilizing of solids in a wide variety of vehicles. If you need this type of service, tell us about it. We may be able to help you.

dag DISPERSIONS

For more information on dispersed pigments call or write ACHESON COLLOIDS CORPORATION, DISPERSED PIGMENTS DIVISION, 420 LEXINGTON AVE., NEW YORK 17, N. Y.

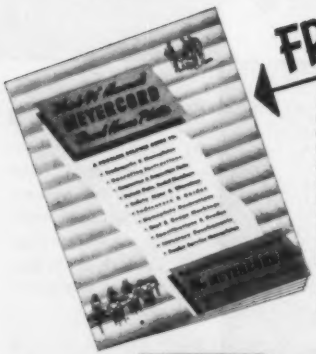
Acheson Colloids Corporation

NAMEPLATE PROBLEMS?

Send for this Manual of...

MEYERCORD DECAL NAMEPLATES

FREE!



Most useful nameplate manual ever offered! 20 full-color pages show hundreds of problem solving uses of Meyercord Decals on glass, metal, wood, china, plastic, rubber, leather—curved, flat or flexible surfaces. Fast, easy application.

WRITE FOR YOUR FREE COPY BUSINESS LETTERHEADS, PLEASE. DEPT. 40-12

The MEYERCORD Co.
World's Largest Decal Manufacturer
5323 W. LAKE ST. CHICAGO 44, ILL.

Shawnee
REG. U.S. PAT. OFF.
DRY COLORS

COLORS FOR PLASTICS

•

Red & Yellow Cadmium Toners

•

Strontium Chromate

•

Organic Red, Maroon, Blue & Green Toners

•

Offerings based on extensive experience with leading plastics manufacturers

KENTUCKY COLOR & CHEMICAL CO.
Incorporated
General Office and Works: Louisville, Ky.
Branches and Representatives in Principal Cities

1950 in Review

(*Continued from pp. 97-108*)

30. "Weathering studies of polyethylene," by V. T. Wallder, W. J. Clarke, J. B. DeCoste, and J. B. Howard, Ind. Eng. Chem. *42*, 2320-2325 (Nov. 1950).

31. "Low-molecular weight polyethylene resins," by C. W. Patton, SPE J. *6*, 11-12 (Feb. 1950).

32. "Filled polyethylene compounds," by R. Bostwick and R. H. Carey, Ind. Eng. Chem *42*, 848-849 (May 1950).

33. "Polyethylene-polyisobutylene blends," by R. G. Newberg, Modern Packaging *23*, 121-124, 172 (Jan. 1950).

34. "Fluorocarbon moldings," MODERN PLASTICS *27*, 148 (July 1950).

35. "The fluorocarbons," by J. H. Simons, Chemical Eng. *57*, 129-136 (July 1950).

36. "Fluorocarbon resins appraised," by A. E. Javitz, Electrical Mfg. *46*, 76-82, 180, 182, 184 (Aug.); 80-85, 184, 186, 188, 190, 192, 194, 196, 198, 200 (Sept. 1950).

37. "Tetrafluoroethylene," by D. B. Hanson, MODERN PLASTICS *28*, 88, 151, 152 (Dec. 1950).

38. "Meet Teflon," Factory Management and Maintenance *108*, Part 1, 65-66 (Apr. 1950).

39. "Price is higher, cost is lower," MODERN PLASTICS *27*, 120-121 (Jan. 1950).

40. "Saving 'dough' on bread dough," MODERN PLASTICS *27*, 120 (Jan. 1950).

41. "Trifluorochloroethylene," by J. A. Jupa, MODERN PLASTICS *28*, 84, 85 (Dec. 1950).

42. "New fluorine plastics," by L. C. Rubin, Product Eng. *21*, 130-134 (May 1950).

43. "Trifluorochloroethylene polymers," by L. C. Rubin, SPE J. *6*, 7-8 (Oct. 1950).

44. "Effect of chemicals on Fluorothene," by S. E. Frey, J. D. Gibson, and R. H. Lafferty, Jr., Ind. Eng. Chem. *42*, 2314-2317 (Nov. 1950).

45. "Phase equilibria between Fluorothene and solvents," by R. E. McHenry, S. E. Frey, J. D. Gibson, and R. H. Lafferty, Jr., Ind. Eng. Chem. *42*, 2317-2319 (Nov. 1950).

46. "Nylon stands the gaff," MODERN PLASTICS *27*, 105, 106 (Apr. 1950).

47. "Nylon plastics make tough components," Electrical Mfg. *45*, 110-114, 194, 196, 198, 200, 202, 204 (Apr. 1950).

48. "Nylon in bearings and gears," by W. C. Wall, Product Eng. *21*, 102-107 (July 1950).

49. "Nylon inserts for self-lock nuts," Brit. Plastics *21*, 664-665 (Dec. 1949).

50. "Multilinked polyamides," by J. R. Schaefgen and P. J. Flory, J. Am. Chem. Soc. *72*, 689-701 (Feb. 1950).

51. "Structure and physical properties of massive nylon," by G. L. Clark, M. H. Mueller, and L. L. Stott, Ind. Eng. Chem. *42*, 831-837 (May 1950).

52. "Phenolic-sand foundry molds," MODERN PLASTICS *27*, 79-80, 82-83, 86, 156, 158 (July 1950).

53. "Resinated sand molds," by L. N. Phillips, Brit. Plastics *22*, 197-204 (Apr. 1950).

54. "Improving on nature's wood," MODERN PLASTICS *27*, 64-66 (July 1950).

55. "Decorated molded wood-waste tray," MODERN PLASTICS *27*, 146 (May 1950).

56. "Plastic properties in wood," by E. G. Halbrquist, MODERN PLASTICS *27*, 100, 152 (Aug. 1950).

57. "Jobs cast plastics can do," MODERN PLASTICS *28*, 59-63 (Dec. 1950).

58. "Phenolic moldings with nylon filler," by E. E. Halls, Plastics (London) *15*, 194-196 (July 1950).

59. "Koresin and related resins," by C. S. Marvel, R. J. Gander, and R. R. Chambers, J. Polymer Sci. *4*, 689-702 (Dec. 1949).

60. "Water content of hydrophilic phenol-formaldehyde resins: Vapor pressure-temperature relationships," by R. W. Bentz and H. A. Neville, J. Polymer Sci. *4*, 673-688 (Dec. 1949).

61. "Good news for dish jockeys," MODERN PLASTICS *27*, 92 (Apr. 1950).

62. "Low pressure resins," by B. Parkyn, Plastics (London) *15*, 66-67 (Mar. 1950).

63. "Better washer liner costs less," MODERN PLASTICS *27*, 93 (Apr. 1950).

64. "Mineral-filled alkyd," MODERN PLASTICS *28*, 85, 86 (Dec. 1950).

66. "Thermalastic insulation improves high-voltage generator coils," by G. L. Moses, Westinghouse Eng. *10*, 163-165 (July 1950).

67. "Silicone rubber," by P. C. Servais and D. C. Youngs, MODERN PLASTICS *28*, 83, 84 (Dec. 1950).

68. "Silicone rubber emerges as a dielectrical material," by J. F. Dexter, Electrical Mfg. *45*, 100-103, 200, 202, 204 (June 1950).

69. "Recent progress made in silicone rubber materials," by C. E. Arnstein, and R. D. Rowley, Materials and Methods *30*, No. 4, 73-76 (1949).

70. "Silicones, with reference to some laboratory tests on resin DC-2103," by H. R. Poole, Trans. Plastics Inst. (London) *17*, No. 27, 12-31 (1949).

71. "Silicones," by D. V. N. Hardy, J. Oil and Colour Chemists' Assoc. *32*, 202-221 (1949).

72. "Silicone surface coatings," by M. A. Glaser, Product Eng. *21*, 109-111 (Feb. 1950).

73. "Size of silicone molecules," by T. G. Rochow and E. G. Rochow, Science *111*, 271-275 (1950).

74. "Fabricating resin-rubber sheet," MODERN PLASTICS *27*, 66, 67 (May 1950).

75. "Tough thermoset," MODERN PLASTICS *27*, 143 (June 1950).

76. "Styrene's march of triumph," MODERN PLASTICS *28*, 78-81, 174 (Nov. 1950).

77. "Styrene plastics," by S. E. Glick, Product Eng. *21*, 81-86, 159 (Mar. 1950).

78. "Copolymer resins for rubber," by W. H. Alkes, MODERN PLASTICS *27*, 72-74 (Feb. 1950).

79. "Styrene copolymers in alkyd resins," by N. R. Bhow and H. F. Payne, Ind. Eng. Chem. *42*, 700-703 (Apr. 1950).

80. "Styrenation of dehydrated castor oil," by H. M. Hoogsteen, A. E. Young, and M. K. Smith, Ind. Eng. Chem. *42*, 1587-1591 (Aug. 1950).

81. "Polymerization of *m*- and *p*-formylstyrenes," by R. H. Wiley and P. H. Hobson, J. Polymer Sci. *5*, 483-486 (Aug. 1950).

82. "Polymers and copolymers of *o*-acetoxystyrene and *o*-hydroxystyrene," by C. S. Marvel and N. S. Rao, J. Polymer Sci. *4*, 703-709 (Dec. 1949).

83. "Preparation of 1,4-divinyl-2,3,5,6-tetrachlorobenzene and its copolymerization with styrene," by S. D. Ross, M. Markarian, H. H. Young, Jr., and M. Nazzewski, J. Am. Chem. Soc. *72*, 1133-1137 (Mar. 1950).

84. "Influence of activated carbon on styrene polymerization," by J. W. Breitenbach and H. Preussler, J. Polymer Sci. *4*, 751-754 (Dec. 1949).

85. "Chain initiation in styrene polymerization," by W. V. Smith, J. Am. Chem. Soc. *71*, 4077-4082 (Dec. 1949).

86. "Hyatt Award," MODERN PLASTICS *27*, 67 (July 1950).

87. "Polyvinyl chloride pastes," by D. L. Clarkson and N. D. MacLeod, Chem. and Ind. *1949*, 751-755.

88. "Organosol formulation," by E. R. Nielson, MODERN PLASTICS *27*, 97, 100, 102 (May 1950).

89. "Stabilization of vinyl plastics containing chloroparaffins," by J. G. Hendricks, E. L. White, and D. S. Belley, Ind. Eng. Chem. *42*, 899-905 (May 1950).

90. "Properties and application of rigid P.V.C.," by W. L. J. de Nie and L. H. T. Voorthuis," Brit. Plastics *22*, 286-293 (June 1950).

91. "Developing fields for P. V. C. sheeting," by T. W. Fazakerley, Brit. Plastics *23*, 91-93 (Sept. 1950).

92. "Embossing upgrades vinyl," MODERN PLASTICS *28*, 89-91 (Sept. 1950).

93. "Developments with cold molding thermoplastic material," Brit. Plastics *22*, 153-155 (Mar. 1950).

94. "Soft products for hard use," MODERN PLASTICS *28*, 73-78, 166-167 (Sept. 1950).

95. "Cadmium pigments for P. V. C.," by

(*Continued on p. 157*)

•MANUFACTURERS' LITERATURE•

To obtain any of the booklets or catalogs listed below, simply circle the corresponding number on the post card, fill in the information requested, and mail.

MATERIALS

MOLDS AND DIES. The services offered by The Parker Stamp Works in the manufacture of all types of plastic molds and die casting dies are covered in this four-page folder. The Parker Stamp Works, Inc. **(1-800)**

PLASKON ALKYD. Folder describing electronic applications of Plaskon Alkyd molding compounds. Plaskon Div., Libbey-Owens-Ford Glass Co. **(1-801)**

FIBERGLAS REINFORCED PLASTICS. Manual containing complete information on properties, applications, economics, and typical manufacturing methods of Fiberglas reinforced plastics. Includes design considerations, suggestions on resin selection, etc. 36 pages. Owens-Corning Fiberglas Corp. **(1-802)**

INSUROK. Characteristics, advantages, and suggested uses of laminated and molded Insurok are covered. 4 pages. The Richardson Co. **(1-803)**

MOLD MAKERS' SUPPLIES. Latest supplementary catalog listing tools, supplies, and other items used in making molds. Includes price list. 24 pages. Detroit Mold Engineering Co. **(1-804)**

COLD-BOND WOOD GLUES. Description of the advantages and methods of application of fast-setting polyvinyl resins for use in the woodworking industries. 4 pages. American Polymer Corp. **(1-805)**

FULLY AUTOMATIC MOLDING. Illustrated 24 page booklet which contains a thorough discussion of the advantages and economies of fully automatic molding of thermosetting plastics. F. J. Stokes Machine Co. **(1-806)**

SURFACE PYROMETERS. Described are various standard, combination, and special models of Cambridge Pyrometers. 12 pages, plus price list. Cambridge Instrument Co., Inc. **(1-807)**

PROTECTIVE LININGS FOR STEEL CONTAINERS. Useful in selecting standard coating to meet individual needs, this booklet describes protective linings for drums for packaging animal oils, solvents, etc. The Glidden Co. **(1-808)**

CORROSION-RESISTANT PAINT. Two solutions of plastic resins, plasticizers, and selected pigments which protect surfaces from attack by acids, alkalies, oils, and alcohols, are described. U. S. Stoneware. **(1-809)**

GENERAL PURPOSE ADHESIVE. Technical data sheet about an adhesive capable of satisfactorily bonding painted, enameled, waxed, and other surfaces. Also recommended for laminating, etc. American Resinous Chemicals Corp. **(1-810)**

INJECTION MOLDING MACHINE. Specifications and description of an automatic controlled cycle injection molding machine with four-ounce capacity. R. H. Windsor, Ltd. **(1-811)**

TETRAFLUOROETHYLENE RESIN SUSPENSOIDS. Eight-page bulletin summarizing the uses, properties, formulation, and methods of processing stable aqueous dispersions of "Teflon." Polychemicals Dept., E. I. du Pont de Nemours & Co., Inc. **(1-812)**

HYDRAULIC PRESSES. Nine specialized presses for molding endless flat belts, endless V-belts, and floor tiles are covered. Adamson United Co. **(1-813)**

PRINTWEIGH SCALES. Folder explaining the advantages of various Toledo scales which yield printed weight records. Toledo Scale Co. **(1-814)**

BAKELITE POLYETHYLENE. Summary of the properties of polyethylene resins, the forms available, several outstanding applications, and various methods of fabrication. Includes technical data and average properties. 24 illustrated pages. Bakelite Div., Union Carbide and Carbon Corp. **(1-815)**

HEATERS FOR COATING. New type Fiberglas Super-Heaters for use in plastisol and organosol coating operations are explained. Sill Industries. **(1-816)**

PLASTICS INJECTION PRESS. Specification sheet and description of a fast-cycling two-ounce capacity injection press. The Van Dorn Iron Works Co. **(1-817)**

CUTTER AND TOOL GRINDER. Full descriptive catalog on the Cincinnati Monoset cutter and tool grinder for making new end mills, reamers, counterbores, etc., and for reconditioning old ones. The Cincinnati Milling Machine Co. **(1-818)**

CHEMIGUM LATEX. Technical data sheet describing Chemigum Latex 245, a butadiene-acrylonitrile type synthetic for use in adhesives, fabric and paper coating, and impregnants. Chemical Div., Goodyear Tire & Rubber Co., Inc. **(1-819)**

LIQUID LINE FILTERS. Engineering data and description of Marvel synclinal filters for in-line filtration of non-corrosive liquids, circulating and low pressure systems. Marvel Engineering Co. **(1-820)**

BAND SAW TIRES. Described are Carter's "Jiffy-Tires"—for band saw wheels. Includes mounting instructions. Carter Products Co. **(1-821)**

MANUFACTURERS' LITERATURE DEPARTMENT
MODERN PLASTICS

I am interested in the following items:

1-800	1-801	1-802	1-803	1-804	1-805	1-806	1-807	1-808	1-809	1-810
1-811	1-812	1-813	1-814	1-815	1-816	1-817	1-818	1-819	1-820	1-821
1-822	1-823	1-824	1-825	1-826	1-827	1-828	1-829	1-830	1-831	1-832
1-833	1-834	1-835	1-836	1-837	1-838	1-839	1-840	1-841	1-842	1-843

If you do not now subscribe to MODERN PLASTICS, but wish to receive the next 12 issues ($5 everywhere), just check here ☐

NAME ..... POSITION .....
(Please Print Plainly)

COMPANY .....

STREET ..... CITY ..... STATE .....

(Not Valid After April 1, 1951)

•MANUFACTURERS' LITERATURE•

To obtain any of the booklets or catalogs listed below, simply circle the corresponding number on the post card, fill in the information requested, and mail.

PLYWOOD ADHESIVES. Uformite 500 and 430 with catalyst—urea formaldehyde adhesives for use in the "hot stacking" method of plywood production. Rohm and Haas Co. (1-822)

LIQUID UREA RESINS. Field service report telling how PMMA tests help evaluate the properties of liquid urea resins. Monsanto Chemical Co. (1-823)

SIFTERS. Description of various Day Ro-Ball sifters, their features, operations, and screen specifications. 6 pages. The J. H. Day Co. Inc. (1-824)

POLYETHYLENE SEALER. A foot operated sealer for bags made of polyethylene and other plastics films is described. Amsco Packaging Machinery, Inc. (1-825)

SYNTHANE INDUSTRIAL PLASTICS. General catalog presents properties, forms, applications, and technical data on laminated thermosetting plastics. Synthane Corp. (1-826)

OVENS FOR PLASTICS PRODUCTS. Applications, specifications, and advantages of the Blodgett No. 158 gas-fired oven are presented in this four-page folder. Prices, complete specifications, and floor spaces are also given. The G. S. Blodgett Co., Inc. (1-827)

ACRYVIN CASTING ACRYLICS. The types available, casting theory and technique, types of molds, applications of Acryvin acrylic castings, and other details are discussed in this four-page bulletin. Acryvin Corp. of America. (1-828)

PARTS MARKING MACHINES. Illustrations and features of various Acromark parts marking machines are given. Three other machines for use in stamping are also presented. 6 pages. The Acromark Co. (1-829)

PRODUCTS AND SERVICES. The various products and services of American Cyanamid Co. for industry and agriculture are discussed. 64 pages. American Cyanamid Co. (1-830)

DETERMINING LIGHT-FASTNESS. The Atlas Fade-Ometer used for determining the light-fastness of color is discussed. Information is given on what it is, what it does, and applications. 20 pages. Atlas Electric Devices Co. (1-831)

VINYL PRINTING INKS. An explanation of why ghosting or mark-off occurs in vinyl printing, with a discussion of how to prevent this trouble. Atlas Coatings Corp. (1-832)

CUT-OFF ATTACHMENT. Bulletin discussing automatic rotary-type Cut-Off Attachment for extrusions. Illustrations and specifications included. Barker & Davis Machine Co., Inc. (1-833)

DURITE. Brochure describing the various types of Durite phenolic and urea products now available, as well as the industries in which new and modified Durite products might be utilized. Eight illustrated pages. Chemical Div., The Borden Co. (1-834)

SUCTION PUMPS. Construction features of Allis-Chalmers Type S double suction pump are described in this 24-page bulletin. Contains available sizes, approximate dimensions and head capacities, tells how to figure pumping head, and tabulates friction loss. Allis-Chalmers Mfg. Co. (1-835)

HYDRAULIC VULCANIZER. Three pages of specifications on the new Heinrich hydraulic vulcanizer. A blueprint is included. Baldwin Southwark Div., The Baldwin Locomotive Works. (1-836)

PLASTIC GLAZING. Brochure illustrating and describing various uses of Vimlite, a Celanese plastic glazing, for use in poultry houses, plants, and as insulation in partitions, etc. Sample is included. Celanese Corp. of America. (1-837)

ACETATE MOLDING POWDER. Ampacet, a thermoplastic cellulose acetate molding powder for injection and extrusion molding, available in crystal-clear transparent and all colors, is discussed. 4 pages. American Molding Powder & Chemical Corp. (1-838)

TOOL STEEL SELECTOR. Circular chart which quickly tells exactly what type of tool steel should be used for about 95% of the machine-tool operations found in jobbing and specialty machine shops. Instructions for use included. Crucible Steel Co. of America. (1-839)

VINYL INSULATING COMPOUND. Booklet describing extruding vinyl insulating compound, including technical information. Illustrated. 4 pages. Burgess Pigment Co. (1-840)

DESIGN DATA ON PLASTICS. Pertinent information relating to mold design, molding methods and equipment, property charts of molding compounds and design considerations. 24 pages, illustrated. General Electric Co. (1-841)

CARBON BLACKS. Report including tests showing the relative properties of two Cabot furnace blacks having outstanding extrusion and "smoothout" properties: namely, Sterling SO and Vulcan 1. 8 pages. Godfrey L. Cabot, Inc. (1-842)

PLASTICS GRANULATING MACHINES. Various Cumberland plastics granulating machines are presented with technical information on each. Also included are the advantages of features of these machines. Price list is provided. 10 pages. Cumberland Engineering Co. (1-843)

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 2654 (Sec. 34.9, P. L. & R.), New York, N.Y.

MODERN PLASTICS

122 East 42nd Street

NEW YORK 17, N. Y.

HEAT FOR PLASTIC PROCESSING

Subscription Order Form

MODERN PLASTICS
122 East 42nd Street, New York 17, N. Y.

Please send me MODERN PLASTICS every month beginning with the ..... issue.

One year $5.00 ☐; Two years $8.00 ☐; Three years $10.00 ☐

I Enclose $.....

Name.....

Company.....

Street.....

City..... Zone..... State.....

Canadian Rates: $5.00 one year, $8.00 two years, $10.00 three years.
Foreign Rates: $5.00 one year, $8.00 two years, $10.00 three years.
All subscriptions payable in U. S. Funds or equivalent.

Order Form

I Enclose $.....

Name.....

Company.....

Street.....

City..... Zone..... State.....

PATENT 2161935

Am. Chem. Soc. *72*, 1303-1307 (Mar. 1950).

102. "Copolymerization of maleic anhydride with different vinyl monomers," by M. C. deWilde and G. Smets, J. Polymer Sci. *5*, 253-258 (Apr. 1950).

103. "Structure of ester-lactone polymers. I. Ester-lactones of the maleic anhydride-vinyl acetate interpolymer," by L. M. Minsk, G. P. Waugh, and W. O. Kenyon, J. Am. Chem. Soc. *72*, 2646-2650 (June 1950).

104. "Polymer containing free aldehyde groups," by E. F. Izard, Ind. Eng. Chem. *42*, 2108-2110 (Oct. 1950).

105. "Organic polyvinyl ester production in Germany," by N. Platzer, MODERN PLASTICS *28*, 113-114, 116, 118, 120, 167-168, 170 (Sept. 1950).

106. "Ionic polymerization of some vinyl compounds," by C. E. Schildknecht, A. O. Zoss, and F. Grosser, Ind. Eng. Chem. *41*, 2891-2896 (Dec. 1949).

107. "Intramolecular condensations in vinyl copolymers," by T. Alfrey, Jr., C. Lewis, and B. Magel, J. Am. Chem. Soc. *71*, 3793-3795 (Nov. 1949).

108. "Fabricating endless belts," by H. Chase, MODERN PLASTICS *27*, 89, 92, 94 (June 1950).

109. "Hydroxyethylcellulose and its uses," by W. E. Gloor, B. H. Mahlman, and R. D. Ullrich, Ind. Eng. Chem. *42*, 2150-2153 (Oct. 1950).

110. "Primary hydroxyl groups in hydrolyzed cellulose acetate," by C. J. Malm, L. J. Tanghe, and B. C. Laird, J. Am. Chem. Soc. *72*, 2674-2678 (June 1950).

118. "Testing of sandwich constructions at the Forest Products Laboratory," by E. W. Kuenzi, ASTM Bull. No. 164, 21-28 (Feb. 1950).

119. "Durability tests of Metalite sandwich construction," by D. G. Reid, ASTM Bull. No. 164, 28-31 (Feb. 1950).

120. "Strength properties of rayon-mat honeycomb core materials," by W. J. Kommers, N.A.C.A. Tech. Note No. 2084 (Apr. 1950).

121. "Evaluation of several adhesives and processes for binding sandwich constructions of aluminum facings on paper honeycomb core," by H. W. Eickner, N.A.C.A. Tech. Note No. 2106, 23 pp. (May 1950).

122. "Analysis of shear strength of honeycomb cores for sandwich constructions," by F. Werren and C. B. Norris, N.A.C.A. Tech. Note No. 2208, 18 pp. (Oct. 1950).

123. "30-Foot tower," MODERN PLASTICS *28*, 138 (Dec. 1950).

124. "Foam and the future," MODERN PLASTICS *28*, 83-86, 166-167 (Oct. 1950).

125. "Applications of expanded plastics," Plastics (London) *15*, 93-95 (Apr. 1950).

126. "Laminate panels for building construction," Brit. Plastics *23*, 126-129 (Oct. 1950).

127. "Building with honeycomb plastics," by G. May, Plastics (London) *15*, 90-92 (Apr. 1950).

128. "Nonstructural applications of honeycomb," by G. May, Plastics (London) *15*, 3-6 (Jan. 1950).

129. "What's new in decorative laminates," MODERN PLASTICS *28*, 73-79 (Oct. 1950).

130. "Reinforcement of polyester laminates with

er, H. H. Goslen, and R. B.
TICS *27*, 111-114, 116, 118,

of the properties of lamin-
Bureau of Standards," by
.I. Reinforced Plastics Div.

esin bonds on the water-
paper-base laminates," by
2, 374-377 (1949).
for acrylonitrile," Chem.
1950).
crylate from methallyl al-
ch and L. Lynn, Ind. Eng.
day 1950).
some higher polymethacry-
Crawford, J. Soc. Chem.
).
aryl acrylates and meth-
of the corresponding ace-
Fluachiose, J. H. Lengel, and
m. Chem. Soc. *72*, 839-841

rs of acrylic, crotonic, and methacrylic acids," by N. S. Marans and R. P. Zelinski, J. Am. Chem. Soc. *72*, 2125 (May 1950).

138. "The structure of ester-lactone polymers. II. Ester-lactones of poly-α-chloroacrylic acid," by L. M. Minsk and W. O. Kenyon, J. Am. Chem. Soc. *72*, 2650-2654 (June 1950).

139. "Ethoxylines: What they are, where they are going," by E. Preiswerk and J. Charlton, MODERN PLASTICS *28*, 85-88 (Nov. 1950).

140. "Epoxy resins in glass-cloth laminates," by I. Silver and H. B. Atkinson, Jr., MODERN PLASTICS *28*, 113-114, 116, 118, 120, 122 (Nov. 1950).

141. "New resins provide practical bonding agents for metals," by E. Preiswerk, K. Meyerhans, and E. Denz, Materials and Methods *30*, No. 4, 64-66 (1949).

142. "Dielectric properties of polyethylene terephthalate (Terylene)," by W. Reddish, Trans. Faraday Soc. *46*, 459-475 (June 1950).

143. "Mineral-filled melamine," by W. A. Ward, MODERN PLASTICS *28*, 86, 88 (Dec. 1950).

144. "Aniline-formaldehyde resin, its production and uses," Plastics (London) *15*, 34-38 (Feb. 1950).

145. "Some polymeric derivatives of phosphonitrile chlorine," by C. J. Brown, J. Polymer Sci. *5*, 465-471 (Aug. 1950).

146. "Effect of an acetylenic unit on the physical properties of polyesters and polyurethans," by C. S. Marvel and J. H. Johnson, J. Am. Chem. Soc. *72*, 1674-1677 (Apr. 1950).

(Continued on p. 158)

•MANUFACTURERS' LITERATURE•

PLYWOOD ADHESIVE and 430 with catalyst— hyde adhesives for use i ing" method of plyw Rohm and Haas Co.

LIQUID UREA RESIN report telling how PM evaluate the properties resins. Monsanto Chemi

SIFTERS. Description Ro-Ball sifters, their tions, and screen specif The J. H. Day Co. Inc.

POLYETHYLENE SE erated sealer for bag ethylene and other pl scribed. Amsco Pack Inc.

SYNTHANE INDUST General catalog pre forms, applications, a on laminated therm Synthane Corp.

OVENS FOR PLAST Applications, specifica tages of the Blodgett oven are presented folder. Prices, compl and floor spaces are al Blodgett Co., Inc.

ACRYVIN CASTING types available, casting nique, types of mold Acryvin acrylic castin tails are discussed in t letin. Acryvin Corp. of

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY ENVELOPE

First Class Permit No. 2656 (Sec. 34.9, P. L. & R.), New York, N. Y.

MODERN PLASTICS

122 East 42nd Street

NEW YORK 17, N. Y.

DESIGN DATA ON PLASTICS. Pertinent information relating to mold design, molding methods and equipment, property charts of molding compounds and design considerations. 24 pages, illustrated. General Electric Co. **(1-841)**

CARBON BLACKS. Report including tests showing the relative properties of two Cabot furnace blacks having outstanding extrusion and "smoothout" properties: namely, Sterling SO and Vulcan 1. 8 pages. Godfrey L. Cabot, Inc. **(1-842)**

PLASTICS GRANULATING MACHINES. Various Cumberland plastics granulating machines are presented with technical information on each. Also included are the advantages of features of these machines. Price list is provided. 10 pages. Cumberland Engineering Co. **(1-843)**

Postage Will Be Paid by Addressee

No Postage Stamp Necessary If Mailed in the United States

BUSINESS REPLY CARD

First Class Permit No. 2656 (Sec. 34.9, P. L. & R.), New York, N.Y.

MODERN PLASTICS

122 East 42nd Street

NEW YORK 17, N. Y.

HEAT FOR PLASTIC PROCESSING

Built to required sizes for

INJECTION MOLDING
COMPRESSION MOLDING
EXTRUSION

Band Heaters
(ceramic and mica insulated)
Cartridge Heaters
Strip Heaters
also . . . Special Requirements

These annealing plates indicate one type of heater built to a customer's special requirements.

INDUSTRIAL HEATER CO., INC.
1921-1950
245 Canal Street New York, N. Y.

COTTON FABRICS

FOR
COATING
AND
LAMINATING

★

J.H. LANE & CO., Inc.
250 W. 57th St. • New York, N. Y.

R. B. Wright, Plastics (London) *15*, 167-169 (June 1950).

96. "Vinyl latex coatings," by A. L. Hatfield, Modern Packaging *23*, 192-194 (Apr. 1950).

97. "Preparation and fractionation of poly-4-vinylpyridene," by E. B. Fitzgerald and R. M. Fuoss, Ind. Eng. Chem. *42*, 1603 (Aug. 1950).

98. "Preparation and reactions of sulfonic esters. I. Preparation of polyvinyl sulfonates," by D. D. Reynolds and W. O. Kenyon, J. Am. Chem. Soc. *72*, 1584-1587 (Apr. 1950).

99. "Preparation and reactions of sulfonic esters. II. The reaction of polyvinyl sulfonates with tertiary amines," by D. D. Reynolds and W. O. Kenyon, J. Am. Chem. Soc. *72*, 1587-1590 (Apr. 1950).

100. "Preparation and reactions of sulfonic esters. III Reactions of polyvinyl sulfonates with primary and secondary amines," by D. D. Reynolds and W. O. Kenyon, J. Am. Chem. Soc. *72*, 1591-1593 (Apr. 1950).

101. "Vinylidene cyanide. I," by A. E. Ardis, S. J. Averill, H. Gilbert, F. F. Miller, R. F Schmidt, F. D. Stewart, and H. L. Trumbull, J. Am. Chem. Soc. *72*, 1305-1307 (Mar. 1950).

102. "Copolymerization of maleic anhydride with different vinyl monomers," by M. C. deWilde and G. Smets, J. Polymer Sci. *5*, 253-258 (Apr. 1950).

103. "Structure of ester-lactone polymers. I. Ester-lactones of the maleic anhydride-vinyl acetate interpolymer," by L. M. Minsk, G. P. Waugh, and W. O. Kenyon, J. Am. Chem. Soc. *72*, 2646-2650 (June 1950).

104. "Polymer containing free aldehyde groups," by E. F. Izard, Ind. Eng. Chem. *42*, 2108-2110 (Oct. 1950).

105. "Organic polyvinyl ester production in Germany," by N. Platzer, Modern Plastics *28*, 113-114, 116, 118, 120, 167-168, 170 (Sept. 1950).

106. "Ionic polymerization of some vinyl compounds," by C. E. Schildknecht, A. O. Zoss, and F. Grosser, Ind. Eng. Chem. *41*, 2891-2896 (Dec. 1949).

107. "Intramolecular condensations in vinyl copolymers," by T. Alfrey, Jr., C. Lewis, and B. Magel, J. Am. Chem. Soc. *71*, 3793-3795 (Nov. 1949).

108. "Fabricating endless belts," by H. Chase, Modern Plastics *27*, 89, 92, 94 (June 1950).

109. "Hydroxyethylcellulose and its uses," by W. E. Gloor, B. H. Mahlman, and R. D. Ullrich, Ind. Eng. Chem. *42*, 2150-2153 (Oct. 1950).

110. "Primary hydroxyl groups in hydrolyzed cellulose acetate," by C. J. Malm, L. J. Tanghe, and B. C. Laird, J. Am. Chem. Soc. *72*, 2674-2678 (June 1950).

111. "Solubility and structure of cellulose acetates," by F. Hewlett and A. R. Urquhart, Textile Mfr. *75*, 395 (1949).

112. "Cross-linking of cellulose acetate," by R. W. Moncrieff, Plastics (London) *14*, 108-110 (Nov.); 135-137 (Dec. 1949).

113. "Analysis of sodium carboxymethyl cellulose," by A. Z. Conner and R. W. Eyler, Analytical Chem. *22*, 1129-1132 (Sept. 1950).

114. "Preparation and properties of cellulose phosphates," by J. D. Reid and L. W. Mazzeno, Jr., Ind. Eng. Chem. *41*, 2828-2831 (Dec. 1949).

115. "Composition of two types of cellulose phosphates," by J. D. Reid, L. W. Mazzeno, Jr., and E. M. Buras, Jr., Ind. Eng. Chem. *41*, 2831-2834 (Dec. 1949).

116. "Pyridinium salts of cellulose acetate-chloroacetate," by C. J. Malm, J. W. Mench, R. F. Williams, Jr., and G. D. Hiatt, Ind. Eng. Chem. *42*, 1547-1550 (Aug. 1950).

117. "Preliminary considerations for testing sandwich radome materials," by G. R. Huisman and R. H. Wight, ASTM Bull. No. 164, 19-20 (Feb. 1950).

118. "Testing of sandwich constructions at the Forest Products Laboratory," by E. W. Kuenzi, ASTM Bull. No. 164, 21-28 (Feb. 1950).

119. "Durability tests of Metalite sandwich construction," by D. G. Reid, ASTM Bull. No. 164, 28-31 (Feb. 1950).

120. "Strength properties of rayon-mat honeycomb core materials," by W. J. Kommers, N.A.C.A. Tech. Note No. 2084 (Apr. 1950).

121. "Evaluation of several adhesives and processes for binding sandwich constructions of aluminum facings on paper honeycomb core," by H. W. Eickner, N.A.C.A. Tech. Note No. 2106, 23 pp. (May 1950).

122. "Analysis of shear strength of honeycomb cores for sandwich constructions," by F. Werren and C. B. Norris, N.A.C.A. Tech. Note No. 2208, 18 pp. (Oct. 1950).

123. "30-Foot tower," Modern Plastics *28*, 138 (Dec. 1950).

124. "Foam and the future," Modern Plastics *28*, 83-86, 166-167 (Oct. 1950).

125. "Applications of expanded plastics," Plastics (London) *15*, 93-95 (Apr. 1950).

126. "Laminate panels for building construction," Brit. Plastics *23*, 126-129 (Oct. 1950).

127. "Building with honeycomb plastics," by G. May, Plastics (London) *15*, 90-92 (Apr. 1950).

128. "Nonstructural applications of honeycomb," by G. May, Plastics (London) *15*, 3-6 (Jan. 1950).

129. "What's new in decorative laminates," Modern Plastics *28*, 73-79 (Oct. 1950).

130. "Reinforcement of polyester laminates with fabrics," by M. Gallagher, H. H. Goslen, and R. B. Seymour, Modern Plastics *27*, 111-114, 116, 118, 120, 172 (Mar. 1950).

131. "Investigations of the properties of laminates at the National Bureau of Standards," by G. M. Kline, Proc. S.P.I. Reinforced Plastics Div. *1950* (preprint).

132. "Influence of resin bonds on the water-immersion stability of paper-base laminates," by M. P. Seidel, TAPPI *32*, 374-377 (1949).

133. "Fourth round for acrylonitrile," Chem. Ind. *66*, 345-346 (Mar. 1950).

134. "Methyl methacrylate from methallyl alcohol," by J. M. Church and L. Lynn, Ind. Eng. Chem. *42*, 768-776 (May 1950).

135. "Properties of some higher polymethacrylic esters," by J. W. C. Crawford, J. Soc. Chem. Ind. *68*, 201-208 (1949).

136. "Preparation of aryl acrylates and methacrylates by pyrolysis of the corresponding acetoxy esters," by R. M. Filachione, J. H. Lengel, and W. P. Ratchford, J. Am. Chem. Soc. *72*, 839-841 (Feb. 1950).

137. "Nitroalkyl esters of acrylic, crotonic, and methacrylic acids," by N. S. Marans and R. P. Zelinski, J. Am. Chem. Soc. *72*, 2125 (May 1950).

138. "The structure of ester-lactone polymers. II. Ester-lactones of poly-α-chloroacrylic acid," by L. M. Minsk and W. O. Kenyon, J. Am. Chem. Soc. *72*, 2650-2654 (June 1950).

139. "Ethoxylines: What they are, where they are going," by E. Preiswerk and J. Charlton, Modern Plastics *28*, 85-88 (Nov. 1950).

140. "Epoxy resins in glass-cloth laminates," by I. Silver and H. B. Atkinson, Jr., Modern Plastics *28*, 113-114, 116, 118, 120, 122 (Nov. 1950).

141. "New resins provide practical bonding agents for metals," by E. Preiswerk, K. Meyerhans, and E. Denz, Materials and Methods *30*, No. 4, 64-66 (1949).

142. "Dielectric properties of polyethylene terephthalate (Terylene)," by W. Reddish, Trans. Faraday Soc. *46*, 459-475 (June 1950).

143. "Mineral-filled melamine," by W. A. Ward, Modern Plastics *28*, 86, 88 (Dec. 1950).

144. "Aniline-formaldehyde resin, its production and uses," Plastics (London) *15*, 34-38 (Feb. 1950).

145. "Some polymeric derivatives of phosphonitrile chlorine," by C. J. Brown, J. Polymer Sci. *5*, 465-471 (Aug. 1950).

146. "Effect of an acetylenic unit on the physical properties of polyesters and polyurethans," by C. S. Marvel and J. H. Johnson, J. Am. Chem. Soc. *72*, 1674-1677 (Apr. 1950).

(*Continued on p. 158*)

Miccrosol

A superior Vinyl Plastisol developed and manufactured to your specifications by MICHIGAN CHROME & CHEMICAL COMPANY.

MICCROSOL is specially formulated for a wide variety of coating applications as molding, dipping, etc. It is ideal for slush molding of toys and other suitable flexible objects; as well as a coating material for gloves, fabric, wire goods and packaging protection.

Our engineers will be glad to help you with your molding or coating applications. Write for consultation on your problem.

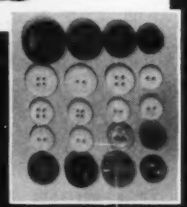
MICHIGAN CHROME & CHEMICAL COMPANY

6342 East Jefferson Avenue
Detroit 7, Michigan

micro products

Buttondex
AUTOMATIC BUTTON FINISHER!

saves time!
saves space!
cuts costs!



This compact automatic machine punches fins and cleans holes of Urea, Phenol and Melamine buttons.

- CAN BE SET AND RESET TO HANDLE ALL SIZES
- PRODUCTION UP TO 450 PER MINUTE
- COMES IN 3 SIZES

MODEL S ACCEPTS SIZES 12 to 34
MODEL SP ACCEPTS SIZES 36 to 50
MODEL SX ACCEPTS SIZES 12 to 50

WRITE TODAY for full details!

ButtOndeX CORP.

"Your Problem is Our Product" - 386 Fourth Ave., New York, N.Y.

147. "Polyalkylene sulfides. II. Preparation of polyhexamethylene sulfide in emulsion," by C. S. Marvel and P. H. Aldrich, J. Am. Chem. Soc. *72*, 1978-1981 (May 1950).

148. "Polysulfide polymers," by E. M. Fetten and J. S. Jorczak, Ind. Eng. Chem. *42*, 2217-2223 (Nov. 1950).

149. "Rate coefficients in the polymerization of styrene," by H. W. Melville and L. Valentine, Trans. Faraday Soc. *46*, 210-227 (Mar. 1950).

150. "Monomer-polymer ratio in emulsion polymerization of styrene," by S. H. Herzfeld, A. Roginsky, M. L. Corrin, and W. D. Harkins, J. Polymer Sci. *5*, 207-215 (Apr. 1950).

151. "Influence of pressure on the polymerization of styrene," by R. C. Gillham, Trans. Faraday Soc. *46*, 497-503 (June 1950).

152. "Friedel-Crafts copolymerization of chloroprene-styrene," by F. C. Foster, J. Polymer Sci. *5*, 369-374 (June 1950).

153. "Decomposition of cyclohexyl hydroperoxide and the peroxide-catalyzed polymerization of styrene," by A. Farkas and G. Passaglia, J. Am. Chem. Soc. *72*, 3333-3337 (Aug. 1950).

154. "Rate coefficients in the polymerization of methyl methacrylate. II," by M. H. Mackay and H. W. Melville, Trans. Faraday Soc. *46*, 63-78 (Jan. 1950).

155. "Anionic copolymerization of methyl methacrylate and methacrylonitrile," by F. C. Foster, J. Am. Chem. Soc. *72*, 1370-1372 (Mar. 1950).

156. "A redetermination of the absolute rate constants in the polymerization of liquid vinyl acetate," by H. Kwart, H. S. Broadbent, and P. D. Bartlett, J. Am. Chem. Soc. *72*, 1060-1066 (Mar. 1950).

157. "Inhibiting effect of small amounts of acrylonitrile on polymerization of vinyl acetate," by W. R. Conn and H. T. Neher, J. Polymer Sci. *5*, 355-367 (June 1950).

158. "Speed of polymerization and copolymerization of isopropenyl acetate," by R. Hart and G. Smets, J. Polymer Sci. *5*, 55-67 (Feb. 1950).

159. "Polymerization of isobutene by boron trifluoride," by A. G. Evans and G. W. Meadows, Trans. Faraday Soc. *46*, 327-331 (Apr. 1950).

160. "Study of the polymerization of α- and β-pinene with Friedel-Crafts type catalysts," by W. J. Roberts and A. R. Day, J. Am. Chem. Soc. *72*, 1226-1230 (Mar. 1950).

161. "Photosensitization of polymerization reactions," by R. B. Whyte and H. W. Melville, J. Soc. Dyers and Colourists *65*, 703-708 (Dec. 1949).

162. "Termination of biradicals in a polymerizing system," by R. N. Haward, Trans. Faraday Soc. *46*, 204-210 (Mar. 1950).

165. "Effect of oxygen on polymerization systems at 41° F.," by R. W. Hobson and J. D. D'Ianni, Ind. Eng. Chem. *42*, 1572-1577 (Aug. 1950).

164. "Diazothiolic esters (diazo thio ethers): Initiators and modifiers of polymerization reactions," by W. B. Reynolds and E. W. Cotten, Ind. Eng. Chem. *42*, 1905-1910 (Sept. 1950).

165. "General theory of mechanism of emulsion polymerization. II," by W. D. Harkins, J. Polymer Sci. *5*, 217-251 (Apr. 1950).

166. "Progress in the theory of high polymers," by N. J. L. Megson, Brit. Plastics *23*, 39-48 (July 1950).

167. "Prediction of shrinkage in addition polymerizations," by F. S. Nichols and R. G. Flowers, Ind. Eng. Chem. *42*, 292-295 (Feb. 1950).

168. "Emulsion polymerization with ultrasonic vibration," by A. S. Ostroski and R. B. Stambaugh, J. Applied Phys. *21*, 478-482 (June 1950).

169. "Polymerization," by C. C. Winding, Ind. Eng. Chem. *42*, 1724-1731 (Sept 1950).

170. "Modernization of a casein plant," MODERN PLASTICS *28*, 94, 95 (Dec. 1950).

171. "Stabilization of zein filaments," by C. B. Croston, Ind. Eng. Chem. *42*, 482-484 (Mar. 1950).

172. "Bituminous plastics," by D. A. Turner, Brit. Plastics *22*, 32-39 (Jan. 1950).

173. "Allyl starch. A new chemurgic resin," by J. R. Roach and R. Nordgren, Org. Finishing *11*, No. 4, 8-13, 15 (1950).

174. "Tetramethylolcyclohexanol rosin ester in nitrocellulose lacquers," by H. Wittcoff, M. H. Baker, and L. Champlin, Jr., Ind. Eng. Chem. *42*, 1920-1925 (Sept. 1950).

175. "Chlorinated rubber in the paint industry," by B. S. G. Gidvani, Paint Manuf. *19*, 419-424 (1949).

176. "Pliofilm," by N. D. Coulter and P. J. Vaughan, Modern Packaging *23*, 153-158 (May 1950).

177. "New method of manufacturing rubber hydrochloride," by R. Houwink, Rubber Developments *2*, No. 3, 21-22 (1949).

178. "The search for new plasticizers," Plastics (London) *14*, 26-27, 32 (Aug. 1949).

179. "Plasticizers for polyvinyl chloride," by F. Kainer, Brit. Plastics *21*, 677-684 (Dec. 1949).

180. "Diphosphate ester plasticizers," by R. H. Oliver, N. M. Wiederborn, and R. B. Mesrobian, Ind. Eng. Chem. *42*, 488-491 (Mar. 1950).

181. "Dialkyl tetrachlorophthalates as plasticizers," by J. K. Stevenson, L. E. Cheyney, and M. M. Baldwin, Ind. Eng. Chem. *42*, 2170-2175 (Oct. 1950).

182. "Diglycol bis(carbonates) of lactic esters," by C. E. Rehberg, M. B. Dixon, T. J. Dietz, and C. H. Fisher, Ind. Eng. Chem. *42*, 1409-1411 (July 1950).

183. "Plasticizers from lactic acid," by C. E. Rehberg, M. B. Dixon, T. J. Dietz, and P. E. Meiss, Ind. Eng. Chem. *42*, 2374-2375 (Nov. 1950).

184. "Oxaglycol esters as polyvinyl chloride plasticizers," by W. S. Emerson, R. I. Longley, Jr., J. R. Darby, and E. E. Cowell, Ind. Eng. Chem. *42*, 1431-1433 (July 1950).

185. "Plasticizing crystalline polymers," by C. B. Havens, Ind. Eng. Chem. *42*, 315-319 (Feb. 1950).

186. "Colorants for plastics," by B. J. Mayo, Jr., SPE J. *6*, 5 (Oct. 1950).

187. "Stabilizers for vinyl materials," Brit. Plastics *23*, 70-72 (Aug. 1950).

188. "Coumarin derivatives as u. v. light screening agent," Plastics (London) *15*, 115 (Apr. 1950).

189. "Electrosol, a development in eliminating electrostatic accumulations in plastics," by M. J. Ainsworth, SPE J. *5*, 3-6 (Oct. 1949); *6*, 12-16 (Jan. 1950).

Processing

190. "Slush casting large rigid pieces," MODERN PLASTICS *27*, 70-72 (June 1950).

191. "Slush molding vinyl plastisols," by E. B. Greenspun, MODERN PLASTICS *28*, 101-102, 104 (Oct. 1950).

192. "Eighty-two pounds every six minutes," MODERN PLASTICS *28*, 105, 108-109 (Oct. 1950).

193. "Thermoplastic big shots," MODERN PLASTICS *27*, 55-61 (July 1950).

194. "New techniques in reinforced plastics," MODERN PLASTICS *28*, 89, 92 (Dec. 1950).

195. "Role of pressure, temperature, and time in the injection molding process," by G. D. Gilmore and R. S. Spencer, MODERN PLASTICS *27*, 143, 144, 146, 148, 150, 218, 220, 222, 224, 226, 228 (Apr. 1950).

196. "Residual strains in injection molded polystyrene," by R. S. Spencer and G. D. Gilmore, MODERN PLASTICS *28*, 97-98, 100, 102, 104, 106, 108, 155 (Dec. 1950).

197. "Compression molding themoplastics," by D. L. Stanley, MODERN PLASTICS *28*, 107, 110-111 (Nov. 1950).

198. "Axial plunger pumps," MODERN PLASTICS *27*, 81-84 (Feb. 1950).

199. "Fully-automatic compression molding vs. transfer molding," by A. A. Hutchings, MODERN PLASTICS *27*, 131, 132, 134, 216 (Apr. 1950).

200. "Recent developments in compression molding of thermosetting materials," by S. D. Hiltebrandt, SPE J. *6*, 18-21 (Jan. 1950).

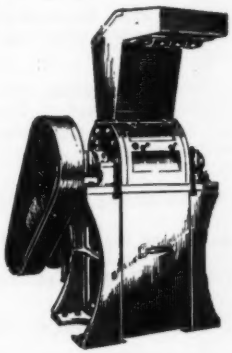
201. "21 years of molding techniques," by J. S. Walker, Brit. Plastics *23*, 32-38 (July 1950).

202. "Annealing injection-molded styrene," by R. I. Dunlap, F. J. Pokigo, and S. E. Glick, MODERN PLASTICS *27*, 83, 86, 88-89, 145 (Aug. 1950).

203. "Theory of mechanical properties of hot

B&J STANDARD IDEAL

PLASTICS SCRAP GRANULATOR OFFERS GREATER UTILITY WITH 6" x 10" WIDE THROAT



Eliminate feeding troubles and clogged hoppers due to gates, sprues and miscellaneous stock locking into masses too large for standard throat openings. Eliminate precutting. And still get the basic recognized advantages of B & J's Standard Ideal: reduction of all types of plastic compounds up to ½" sectional thickness into uniform granules, at the rate of up to 250 pounds hourly. Write re: Standard Ideal "301" for full production data.

ASK YOUR NEAREST REPRESENTATIVE

SAN FRANCISCO, CALIFORNIA: B-H-S Machinery Sales Company; LOS ANGELES, CALIFORNIA: Machinery Sales Corporation; PITTSBURGH, PENNSYLVANIA: Stanley Berg & Company; OMAHA, NEBRASKA: Fuchs Machinery & Supply Co.; CINCINNATI, OHIO: Index Machinery Corporation; SPOKANE, WASHINGTON: W. R. Matthews Machinery & Tool Supply Company; CHICAGO, ILLINOIS: Neff Kohlbusch & Bissell; MILWAUKEE, WISCONSIN: Neff Kohlbusch & Bissell; HOUSTON, TEXAS: Preston Machine Tool Sales Co.; MINNEAPOLIS, MINNESOTA: Charles W. Stone Company; LEOMINSTER, MASSACHUSETTS: Standard Tool Company; DETROIT, MICHIGAN: Thoreson-McCosh, Inc.; CANADA: TORONTO & MONTREAL: Williams & Wilson Ltd.; FOREIGN DISTRIBUTORS: Omni Products Corp., New York 16.

For grinders with cap. of 50 to 3,000 lbs. per hr. contact:

BALL & JEWELL, INC.

22-28 Franklin Street
Brooklyn 22, New York

1865 – 1950

AMPACET®

Cellulose Acetate Molding Powders

in pellets of uniform size or in granules

for Injection molding
for Extrusion molding

Available in crystal clear transparent and all colors — transparent, translucent and opaque.

☆ TOUGH ☆ DURABLE
☆ CHEMICAL RESISTANT
☆ EXCELLENT CLARITY
☆ UNLIMITED COLOR POSSIBILITIES
☆ FORMULATED TO MEET YOUR REQUIREMENTS

POLYSTYRENE

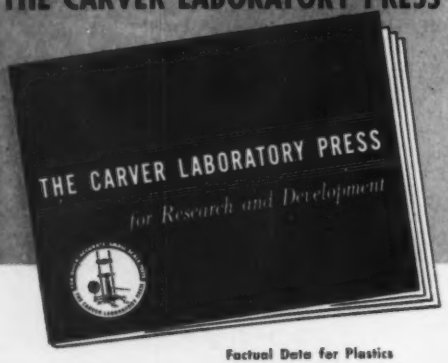
SPECIAL EFFECTS ● SPECIAL COLORS
MOTHER OF PEARL ● TINSEL ● PHOSPHORESCENTS

We custom color to your specifications — colors are matched accurately and kept constant time after time.

AMERICAN MOLDING POWDER and CHEMICAL CORP.

Main Office: 703 Bedford Avenue • Brooklyn 6, N. Y.
Plant: 67 North 9th Street • Brooklyn 11, N. Y.
Phone: MAin 5-7450 • *Cable:* Chemprod Brooklyn

Complete New Catalog describes the Latest Edition of
THE CARVER LABORATORY PRESS



Factual Data for Plastics Research & Development

Send for your copy of this new handy-size manual containing up-to-date information on the Carver Laboratory Press and its many uses.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
343 HUDSON ST. NEW YORK 14, N. Y.

cementing
*Styrofoam®?

Fabricators of Styrofoam ornaments and displays report excellent results with versatile REZ-N-GLUE.

REZ-N-GLUE is ideal for cementing Styrofoam because it is crystal-clear and completely non-staining.

REZ-N-GLUE's mild solvents will not soften the thinnest Styrofoam section. Contains 50% vinyl solids, resulting in minimum shrinkage and maximum mileage.

ORDER A TRIAL QUART OR GALLON TODAY

®
*Styrofoam is the registered trademark of The Dow Chemical Company

Schwartz CHEMICAL CO., INC.
328 West 70th St. New York 23, N. Y.

plastics," by S. J. Loring, Trans. A. S. M. E. *72*, 447-463 (May 1950).
203a. "Equation of state for high polymers," by R. S. Spencer and G. D. Gilmore, J. Applied Phys. *21*, 523-526 (June 1950).
204. "Behavior of granulated polymers under pressure," by R. S. Spencer, G. D. Gilmore, and R. M. Wiley, J. Applied Phys. *21*, 527-531 (June 1950).
205. "Some suggested improvements for injection molding machines," by E. E. Mills, SPE J. *6*, 17-18 (Jan. 1950).
205a. "New injection machine," by J. W. Hendry, SPE J. *6*, 9-10 (Feb. 1950).
206. "Accumulator-operated injection machine," MODERN PLASTICS *27*, 79-80, 82 (Aug. 1950).
207. "Restricted gating for large castings," by W. P. Gobeille, SPE J. *6*, 35-36 (Jan. 1950).
208. "Pin-point gating," by R. G. Davis, SPE J. *6*, 10-12 (Mar. 1950).
209. "Pin-point or restricted gating," by D. G. Kavanagh, Brit. Plastics *22*, 294-296 (June 1950).
210. "Automatic two-color molding," MODERN PLASTICS *27*, 86-87, 90 (Feb. 1950).
211. "Injection molding of derating materials," by J. C. Stokes and A. R. Morse, SPE J. *6*, 3-7 (Feb. 1950).
212. "Field molding problems," by C. J. Snyder, SPE J. *6*, 17-18 (Feb. 1950).
213. "Extruder-compounder," MODERN PLASTICS *28*, 111 (Sept. 1950).
214. "Crosshead extrusion of thermoplastics," by E. G. Fisher, MODERN PLASTICS *27*, 83-86 (May 1950).
215. "Extruding over wood," MODERN PLASTICS *28*, 84-85 (Sept. 1950).
216. "Extrusion-blowing bottles," Brit. Plastics *23*, 98-99 (Sept. 1950).
217. "Extrusion of nylon," by C. P. Fortner, Brit. Plastics *21*, 658-661 (Dec. 1949).
218. "Thermosetting extrusion," by G. Holmgren, SPE J. *6*, 9 (Apr. 1950).
219. "Extrusion needs," by M. S. Greenhalgh, SPE J. *6*, 29-31 (Jan. 1950).
220. "Controversial points on extrusion," by H. E. Buecker, SPE J. *6*, 12-16 (Feb. 1950).
221. "Notes on extrusion," by Z. Rigbi, Brit. Plastics *23*, 100-102 (Sept. 1950).
222. "Preserving fragile objects," by M. A. Arthur, SPE J. *6*, 3, 10 (Apr. 1950).
223. "Acrylics for specimen preservation," Brit. Plastics *22*, 281-285 (June 1950).
224. "Cold-casting medical specimens," Brit. Plastics *23*, 66-66a (Aug. 1950).
225. "Development of the National Bureau of Standards casting resin," by P. J. Franklin, D. M. French, and W. C. Nyberg, Nat. Bur. Standards Circular 493, 10 pp. (May 22, 1950).
226. "Continuous laminating of reinforced plastics," by S. M. Cash, SPE J. *6*, 21-24 (Jan. 1950).
227. "Tooling and raw materials for low pressure molding," by R. C. Bartlett, SPE J. *6*, 5-8, 12 (Sept. 1950).
228. "S. P. I. reinforced plastics conference," MODERN PLASTICS *27*, 85-86, 167 (Mar. 1950).
229. "Boat hulls by low pressure-lamination," by B. Parkyn, Brit. Plastics *22*, 110-114 (Mar. 1950).
230. "Machinery for plastic coating," by A. Galo, SPE J. *6*, 24-27 (Jan. 1950).
231. "Manufacture of P. V. C. coated fabric," Brit. Plastics *22*, 20-25 (Jan. 1950).
232. "Calendering is an art," MODERN PLASTICS *28*, 88-91, 168, 172 (Oct. 1950).
233. "The plastic calender and its auxiliary equipment," by T. J. Kerr, SPE J. *6*, 7-8 (Jan. 1950).
234. "Trends in calenders and calendering in the U.S.A.," Brit. Plastics *23*, 122-125 (Oct. 1950).
235. "Hot gas welding of plastics," by J. A. Neumann, MODERN PLASTICS *28*, 97-102 (Nov. 1950).
236. "Gas-welding of plastics," by J. A. Neumann, Electrical Mfg. *46*, 117-119 (July 1950).
237. "Embossing process gives new effect," MODERN PLASTICS *28*, 72, 73 (Dec. 1950).
238. "New color development for styrene molders," by E. L. Hobson, MODERN PLASTICS *27*, 76-77 (Mar. 1950).
239. "Surface dyeing of plastics," Brit. Plastics *22*, 190-194 (Apr. 1950).
240. "Metallizing by high vacuum," by M. Schneider, MODERN PLASTICS *27*, 135, 138-140 (Apr. 1950).
241. "Multi-hole drilling cuts costs," by H. V. Townsley, MODERN PLASTICS *27*, 103, 108 (Mar. 1950).
242. "Tumbling nylon cams," by H. Chase, MODERN PLASTICS *27*, 100 (Mar. 1950).
243. "Flash removal by new process," by D. H. Chambers, MODERN PLASTICS *27*, 91, 94 (May 1950).
244. "Low cost finishing of plastic parts," Electrical Mfg. *46*, 120-122 (Aug. 1950).
245. "Cleaning plastics components," Brit. Plastics *21*, 598-603 (Nov. 1949).
246. "More on plastics design problems," Electrical Mfg. *45*, 94-97, 176, 178, 180, 182, 184 (Feb. 1950).
247. "Dimensional tolerances of plastics," by G. S. Laaff, Product Eng. *21*, 159 (Apr. 1950).
248. "Standardization of round molds in Germany," by M. Freund, Brit. Plastics *22*, 178-183 (Apr. 1950).
249. "Standardization of molds of cylindrical shape," by H. Turnwald and G. Ehlers, Plastics (London) *15*, 106-108 (Apr. 1950).
250. "Fluid heating and high-temperature cooling for calendars and presses," by P. L. Geiringer, SPE J. *6*, 9-12 (Jan. 1950).
251. "Long-wave radiant heating for plastics," by T. Walsh, SPE J. *6*, 27-29 (Jan. 1950).
252. "Electrical requirements of plastic molding machines are tough," by M. Morgan, Electrical Mfg. *44*, 102-106, 168, 190 (Dec. 1949).
253. "Mold temperature control," by H. A. Meyrick, SPE J. *6*, 20-21 (Feb. 1950).

Applications

254. "Modern ordnance problems—a challenge to plastics," by L. Gilman, MODERN PLASTICS *27*, 87-90, 168 (Mar. 1950).
255. "Molding the 'specialized' plastics," MODERN PLASTICS *28*, 83-86, 88, 151, 152 (Dec. 1950).
256. "A decade of plastics," 1950 MODERN PLASTICS Encyclopedia, pp. 36-50.
257. "Adhesives for laminations," by W. Sederlund, Modern Packaging *24*, 149-151, 203 (Oct. 1950).
258. "Pressure-sensitive adhesive tapes for improved insulation, faster assembly," by P. H. Hedrick and W. H. O'Neal, Electrical Mfg. *46*, 83-87, 172, 174, 176 (July 1950).
259. "Evaluation of adhesives for acoustical tile," by F. W. Reinhart, B. D. Loos, and N. J. DeLollis, ASTM Bull. No. 169, 57-62 (Oct. 1950).
260. "Polyisocyanates in bonding," by T. J. Myrick and J. T. Watts, Trans. Inst. Rubber Ind. *25*, 150-166 (1949).
261. "Fundamentals of adhesion," by G. M. Kline and F. W. Reinhart, Paper Trade J. *129*, 29-34 (Dec. 29, 1949); Mech. Eng. 72, 717-722 (Sept. 1950).
262. "Approximating the attractive forces of adhesion for glass and other surfaces," by F. Moser, ASTM Bull. No. 169, 62-66 (Oct. 1950).
263. "Study of some methods of measuring adhesion of paint films," by C. J. Marsel, New York Univ. Coll. Eng. Symposium on Varnish and Paint Chem. *1948*, 61-70.
264. "Gelation timer for adhesives," by N. A. De Bruyne, MODERN PLASTICS *27*, 104 (May 1950).
265. "Laminate panels for building construction," Brit. Plastics *23*, 126-129 (Oct. 1950).
266. "Plastics in building. I.," by J. B. Singer, Plastics (London) *15*, 184-186 (July 1950).
267. "Glazing with acrylic," MODERN PLASTICS *27*, 72, 73 (May 1950).
268. "Ready-cemented tile," MODERN PLASTICS *27*, 70, 71 (May 1950).
269. "Washable insulating tile," MODERN PLASTICS *27*, 68-69 (July 1950).
270. "Polystyrene partition blocks," MODERN

Smart, smooth, 'contourable' appearance—extremely lightweight with high tensile strength providing durability to withstand maximum hard usage and rough handling. These advantages were built into this Revere Projector Case, made of High Impact Fibre Reinforced Plastic Material with molded Vinylite finish. All exacting requirements of specifications formulated by the 'corps' of Revere designers and engineers have been amply accomplished—and at a minimum of cost. Like many other outstanding Hawley products, the Revere Projector Case is a merited addition to the famous Hawley Molded Pre-form Process.

Contour Styling

The difficult problem of contours—contours possessing extreme beauty—combined with essential structural qualities—are successfully accomplished with 'Hawley' ONE PIECE molding. Here is styling designed to fit the product and to blend gracefully with modern streamlined accessories. If you have a comparable problem, Hawley invites your inquiry.

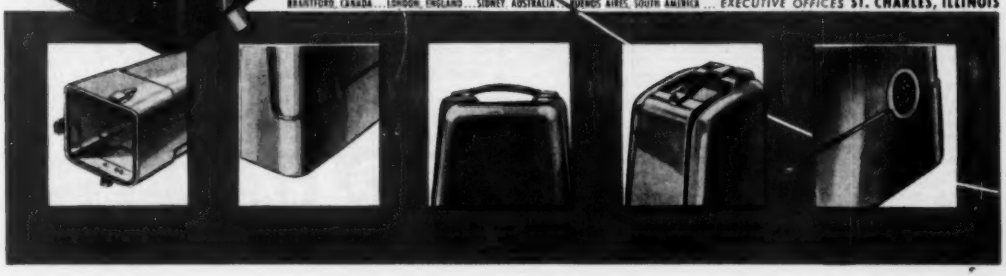
MOULDED FIBRE PRODUCTS

Hawley

RESIN FIBRE PLASTICS

PRODUCTS COMPANY

BRANTFORD, CANADA ... LONDON, ENGLAND ... SIDNEY, AUSTRALIA ... BUENOS AIRES, SOUTH AMERICA ... EXECUTIVE OFFICES ST. CHARLES, ILLINOIS

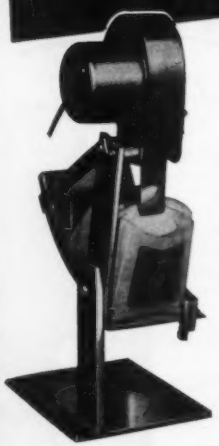


Plastics Molding
for America's
LEADING MANUFACTURERS
ALL MATERIALS — ALL METHODS

Northern
40 YEARS OF
PLASTIC MOLDING EXPERIENCE
INDUSTRIAL CHEMICAL CO.
11 ELKINS ST., SO. BOSTON, MASS., SOuth 8-4240

BRANCH OFFICES
441 Lexington Ave. 627 Powers Bldg. P.O. Box 5604
New York, N.Y. Rochester 4, N.Y. Phila. 29, Pa.
Tel. VAnderbilt 6-1684 Tel. BAker 8701 Tel. Victor 4-8679

FASTER PACKAGING WITH THIS PORTABLE BAGGER



EASY TO USE
LOW IN COST

Designed to handle bagged products with a minimum of effort at a maximum speed. Simple adjustments for height... tilting forward or backward enables operator to set machine at easiest position. Stainless steel trough with capacity of 200 bags. Adjustable to bag sizes. Blower keeps bag clean and free from foreign matter.

Send today for Bulletin No. 1-31

ROCKFORD
Anderson
BROS. MFG. CO.
ILLINOIS

ANDERSON BROS. MFG. CO., ROCKFORD, ILLINOIS

PLASTICS *27*, 142 (May 1950).

271. "Thermoplastics in resilient concrete," by N. W. Farmer, Plastics (London) *15*, 89 (Apr. 1950).

272. "Building," MODERN PLASTICS 27, 169-171 (Jan. 1950).

273. "Vinyl makes better floor mats," MODERN PLASTICS *28*, 84 (Nov. 1950).

274. "Flexible plastic table-top materials," by H. J. Stark and A. W. Cizek, Jr., MODERN PLASTICS *28*, 111-114, 116, 118, 120, 172, 174-175 (Oct. 1950).

275. "Furnishings," MODERN PLASTICS *27*, 125-127 (Jan. 1950).

276. "Plastic pipes invade new markets," MODERN PLASTICS *27*, 69-75 (Mar. 1950).

277. "Vinyl hose in auto plant," MODERN PLASTICS *27*, 61 (May 1950).

278. "Working surfaces for radio-chemical laboratories: paints, plastics, and floor materials," by P. C. Tompkins, O. M. Bizzell, and C. D. Watson, Ind. Eng. Chem. *42*, 1475-1481 (Aug. 1950).

279. "Plastics in the plating shop," by V. Evans, Brit. Plastics *22*, 162-170 (Apr. 1950).

280. "Experiments with laminate at a paper mill," Plastics (London) *15*, 61 (Mar. 1950).

281. "P. V. C. carriers for the biscuit industry," Plastics (London) *14*, 3-5 (Aug. 1949).

282. "Synthetic resins in the tannery," Brit. Plastics *21*, 641-645 (Dec. 1949).

283. "Plastics," by G. M. Kline, Ind. Eng. Chem. *42*, 2001-2006 (Oct. 1950).

284. "Plastics meet the acid test," by R. B. Seymour, MODERN PLASTICS *27*, 91-92, 94, 96, 98, 148, 150 (Aug. 1950).

285. "Construction materials at the 1949 chemical show," Chemical Eng. *57*, 114-115 (Jan. 1950).

286. "Chemical plant in rigid P. V. C.," Brit. Plastics *23*, 80-82 (Sept. 1950).

287. "Transparent blender," MODERN PLASTICS *27*, 142 (July 1950).

288. "Molding applicator brushes in acrylic," Brit. Plastics *23*, 60-61 (Aug. 1950).

289. "Chemical pail," MODERN PLASTICS *27*, 133 (Aug. 1950).

290. "New fields for ion exchange resins," by P. Kluas, MODERN PLASTICS *28*, 79-80 (Sept. 1950).

291. "Oxygen removal from water by amine exchange resins," by G. F. Mills and B. N. Dickinson, Ind. Eng. Chem. *41*, 2842-2844 (Dec. 1949).

292. "Effect of chlorine on cation exchange resins," by D. G. Braithwaite, J. S. D'Amico, and M. T. Thompson, Ind. Eng. Chem. *42*, 312-315 (Feb. 1950).

293. "Polymer emulsion economies spur widening use," by G. L. Brown, Chem. Ind. *67*, 38-40 (July 1950).

294. "Practical factors in applying insulating varnishes," by M. Kronstein, Electrical Mfg. *44*, 96-101, 178, 180, 182, 184, 186, 188 (Dec. 1949).

295. "Antifouling paints," by A. L. Alexander, R. L. Benemelis, and S. B. Crecelius, Ind. Eng. Chem. *42*, 1562-1567 (Aug. 1950).

296. "Vinyl protection of ships' hulls," Brit. Plastics *23*, 68-69 (Aug. 1950).

297. "Vinyl seal coating," MODERN PLASTICS *27*, 149 (May 1950).

298. "Thermoplastics for temporary mechanical protection of materials and equipment," by E. E. Halls, Plastics (London) *15*, 48-49, (Feb.); 74-77 (Mar.); 102-105 (Apr.); 142-144 (May 1950).

299. "Specification and application of wrinkle finishes," by W. A. Walde, Electrical Mfg. *44*, 106-111, 178 (Aug. 1949).

300. "Vinyl resins in industrial coatings," by R. W. Quarles, Official Digest Federation Paint and Varnish Prod. Clubs No. 297, 699-710 (1949).

301. "Properties of heat-reactive oil-soluble phenolic resins," by R. H. Runk, Ind. Eng. Chem. *42*, 2110-2114 (Oct. 1950).

302. "Petroleum-base protective coatings," by W. H. Shearon, Jr. and A. J. Hoiberg, Ind. Eng. Chem. *41*, 2672-2679 (Dec. 1949).

303. "Reactions of resins with drying oils," by P. O. Powers, Ind. Eng. Chem. *42*, 146-150 (Jan. 1950).

304. "Inositol-linseed fatty acid drying oils," by J. P. Gibbons and K. M. Gordon, Ind. Eng. Chem. *42*, 1591-1594 (Aug. 1950).

305. "New flameproofing agents more durable and efficient," by J. M. Fain, Chem. Ind. *66*, 360-361, 468 (Mar. 1950).

306. "Fungicidal and solvent retention problems in organic film coatings," by A. Raffalovich, New York Univ. Coll. Eng. Symposium on Varnish and Paint Chem. *1948*, 51-60.

307. "Evaluation of organic coatings by electrographic printing," by M. Kronstein, M. M. Ward, and R. Roper, Ind. Eng. Chem. *42*, 1568-1572 (Aug. 1950).

308. "Application of infra-red spectroscopy to the study of drying oils and certain plastics," by M. Kronstein, New York Univ. Coll. Eng. Symposium on Varnish and Paint Chem. *1948*, 13-40.

309. "Spray testing with natural and synthetic sea water. II. A study of organic coatings," by A. L. Alexander and T. P. May, A. S. T. M. Proc. *50*, preprint (1950)

310. "Porosity of paint films," by I. Wolock and B. L. Harris, Ind. Eng. Chem. *42*, 1347-1349 (July 1950).

311. "Results on testing surface waterproofings," by F. O. Anderegg, A. S. T. M. Proc. *50*, preprint (1950).

312. "Electrical applications," MODERN PLASTICS *27*, 180-182 (Jan. 1950).

313. "Polystyrene and polythene in electrical cable development," Plastics (London) *15*, 243-244 (Sept. 1950).

314. "Plastics in cable manufacture," by D. C. Hancock, Brit. Plastics *23*, 115-121 (Oct. 1950).

315. "Application of low-loss plastics," by J. Delmonte, Electrical Mfg. *45*, 80-83, 190, 192 (May 1950).

316. "Home appliances," MODERN PLASTICS *27*, 183-188 (Jan. 1950).

317. "Design the right plastic into your major appliance," by F. A. Martin, Electrical Mfg. *45*, 60-65, 154, 156, 158, 160, 162, 164 (Jan. 1950).

318. "Five plastics in a cleaner," MODERN PLASTICS *27*, 102, 103, 204 (Apr. 1950).

319. "Refrigerators," MODERN PLASTICS *27*, 106-113 (Jan. 1950).

320. "One-piece freezer breaker frame," by R. W. Barber, MODERN PLASTICS *28*, 97-100 (Sept. 1950).

321. "Extruded phenolics in refrigerator cabinets," Brit. Plastics *23*, 112-114 (Oct. 1950)

322. "Radio and video," MODERN PLASTICS *27*, 149-153 (Jan. 1950).

323. "Drive-in movie speakers take a beating," MODERN PLASTICS *28*, 82-83 (Sept. 1950).

324. "Phonograph records," MODERN PLASTICS *27*, 134-135, 257 (Jan. 1950).

325. "The vinyl long-playing record," Brit. Plastics *23*, 52-55 (Aug. 1950).

326. "Telephones," MODERN PLASTICS *27*, 114-116, 251 (Jan. 1950).

327. "Research developments in dielectrics," by A. E. Javitz, Electrical Mfg. *45*, 80-85, 172, 174, 176, 178, 180, 182, 184 (Jan. 1950).

328. "Laminated plastics insulation," by P. E. Littlefield, Product Eng. *21*, 135-139 (Apr. 1950).

329. "Plastics: organic," by F. W. Reinhart and G. M. Kline, Medical Physics (Year Book Publishers, Inc., Chicago), Vol. II, 728-736 (1950).

330. "Recent advances in surgical plastics," by G. Blaine, Brit. Plastics *22*, 54-60 (Feb. 1950).

331. "Plastic femur," by J. S. Trevor, MODERN PLASTICS *27*, 121 (Feb. 1950).

332. "Vinyl sponge replaces lung," MODERN PLASTICS *27*, 104 (Apr. 1950).

333. "Measuring Hb," MODERN PLASTICS *27*, 62 (May 1950).

334. "Plastics aid in medical teaching," Brit. Plastics *21*, 634-640 (Dec. 1949).

335. "Transparent acrylic model reveals body's workings," Brit. Plastics *23*, 138 (Oct. 1950).

336. "Research on dental materials at the National Bureau of Standards," by I. C. Schoonover

PLASTIC SCRAP

WE BUY IT
SELL IT
PROCESS IT

Plastics Division:

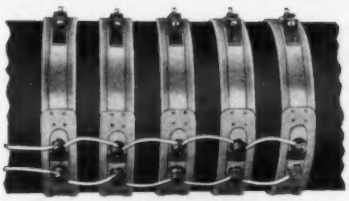
H. MUEHLSTEIN & CO. INC.

60 EAST 42nd STREET, NEW YORK 17, N. Y.

BRANCH OFFICES: Akron • Chicago • Boston • Los Angeles • Memphis

WAREHOUSES: Jersey City • Akron • Boston • Los Angeles • Memphis

WATLOW *Narrow Band* HEATING UNITS PREVENT COSTLY PRODUCTION BREAKDOWNS



• *High Heat Concentration.* 35 to 45 watts/sq. in. — Plastics with high molding temperatures can be handled on any machine equipped with these units.

• *Longer Life.* Special non-expanding metal clamping band over internal winding assures better unit-cylinder contact and heat conductivity—and reduces the required internal operating temperature of the unit itself.

• *Lower Replacement Cost.* Only a fractional heat loss results if unit burns out—only that unit need be replaced—molding machines can be kept in operation at adjusted cycle.

Write for Complete Information on Watlow Narrow Band Units.

SPECIALISTS IN ELECTRIC HEATING UNITS

WATLOW
ELECTRIC MANUFACTURING COMPANY
1328 N. 23d St. St. Louis 6, Mo.

A NEW MACHINE *for* AUTOMATIC SPRAY DECORATING

a variety of small plastic and metal parts at speeds of

700 to 3600 PIECES PER HOUR

— one color right after another!

Entirely air operated. Eliminates the hazards of electric motors, mercury or solenoid switches and the cost of explosion-proof electrical equipment.

Frequency of mask cleaning greatly reduced. Electro-formed masks are inserted so as to be flush with top of the working table. Spraying is from below.

One hand dial regulates the cycling speed to the maximum of the operator's handling capacity. Using a conveyor belt, operator can use both hands to load. Some load up to 80 pieces per minute, thus doubling their productivity.

Another dial regulates the amount of paint sprayed. Extreme flexibility for those who produce a variety of work on pieces having varying requirements and paint coverage. At any given setting, the same amount of paint is sprayed on every part, regardless of the speed of the loading cycle. Effects paint savings of up to 50 percent over hand spraying.

Size: 48" wide, 36" deep. Table height 30". Employs 8 latest AGA DeVilbiss automatic guns and two 2-gallon air-agitated paint pressure tanks with four insert containers.

SEND COUPON TODAY FOR COMPLETE DETAILS

CONFORMING MATRIX CORPORATION

364 Toledo Factories Bldg. Toledo 2, Ohio

Please send, without obligation, details on ( ) Stationary automatic spray painting masking machines; ( ) Hand masks; ( ) Mechanical masking fixtures; ( ) Air-operated masking fixtures; ( ) Rotary table automatic spray painting masking machines; ( ) Quotation on masks for parts (or prints) which I am forwarding.

Name _____

Firm _____

Street _____

City & State _____

and W. Souder, NBS Circular 497 (Aug. 1950).

337. "Automobiles," MODERN PLASTICS *27*, 154-159 (Jan. 1950).

338. "Automotive," by J. K. Totten, SPE J. *6*, 13-15 (Mar. 1950).

339. "Molding for the transport industries," by A. A. Tomkins, Brit. Plastics *22*, 216 (May 1950).

340. "New molded boats," MODERN PLASTICS *28*, 155 (Oct. 1950).

341. "Large area moldings," by I. E. Muskat, Proc. S. P. I. Reinforced Plastics Div. *1950*.

342. "Reinforced race boat hull," MODERN PLASTICS *28*, 75 (Dec. 1950).

343. "Pioneering pays off," MODERN PLASTICS *27*, 110, 111, 211 (Apr. 1950).

344. "Solar stills lead to inflatables," MODERN PLASTICS *27*, 68-69 (June 1950).

345. "Laminated freight cars," MODERN PLASTICS *28*, 64, 65, 150 (Dec. 1950).

346. "Rail tie pads," MODERN PLASTICS *28*, 158 (Sept. 1950).

347. "Newer synthetic fibers," by W. P. ter Horst, Chem. Ind. *66*, 521-526 (Apr. 1950).

348. "New method for forming vinyl polymers in wool," Nature *164*, 576 (Oct. 1949).

349. "Clothing," MODERN PLASTICS *27*, 178-179 (Jan. 1950).

350. "Shoe counters of polyethylene," MODERN PLASTICS *28*, 82 (Oct. 1950).

351. "Use of synthetic shoe soles in the United States," by J. J. Lamb and J. R. Kanagy, The Times Review of Industry *4*, 74, 76 (Aug. 1950).

352. "New soil stabilization method developed with calcium acrylate," Roads and Streets *93*, No. 4, 51 (1950).

353. "Resin-bonding of hardwood fibers in offset papers," by B. W. Scribner, M. B. Shaw, M. J. O'Leary, and J. K. Missimer, J. Research NBS *45*, 208-217 (Sept. 1950).

354. "Plastics and the printing industry," Plastics (London) *14*, 119-121 (Dec. 1949).

355. "Glass fiber laminates in cartography," by E. W. Jackson, Brit. Plastics *22*, 272 (June 1950).

356. "Printed sheets precision formed," by E. B. Stratton, Jr., MODERN PLASTICS *28*, 105 (Sept. 1950).

357. "Engineering drawings on vinyl," MODERN PLASTICS *27*, 97-99 (Mar. 1950).

358. "Improved safety motion picture film support," by C. R. Fordyce, J. Soc. Motion Picture Engineers *51*, 331-350 (Oct. 1948).

359. "Plastics in batteries," MODERN PLASTICS *27*, 59-64, 144 (June 1950).

360. "Sweeper bristles," MODERN PLASTICS *27*, 131 (Aug. 1950).

361. "Photography," MODERN PLASTICS *27*, 128-135 (Jan. 1950).

362. "Molding cuts camera costs," MODERN PLASTICS *27*, 70-71 (Aug. 1950).

363. "Polyester chair takes the prize," MODERN PLASTICS *27*, 67, 147 (Aug. 1950).

364. "New safety helmet made with a range of plastic materials," Plastics (London) *15*, 7 (Jan. 1950).

365. "Phenolic-impregnated fire helmet," MODERN PLASTICS *28*, 91 (Nov. 1950).

366. "Plastics upgrade luggage," MODERN PLASTICS *27*, 55-60 (May 1950).

367. "Transparent working models for design studies," Product Eng. *21*, 118-119 (Jan. 1950).

368. "Navigational aids use phenolics," Brit. Plastics *23*, 83-85 (Sept. 1950).

369. "Plastics films for packaging," by H. Barron, Brit. Plastics *22*, 120-130 (Mar. 1950).

370. "Transparent packaging films," by C. L. Capper, Trans. Inst. Rubber Ind. *25*, 225 (1949).

371. "The plastic bottle," Plastics (London) *14*, 36-37 (Sept. 1949).

372. "The 'Resil' pack," Plastics (London) *15*, 140-141 (May 1950).

373. "Containers for air transport," by G. May, Plastics (London) *15*, 238-239 (Sept. 1950).

374. "Parachute harness," MODERN PLASTICS *28*, 165 (Nov. 1950).

375. "Signs and displays," MODERN PLASTICS *27*, 145-148 (Jan. 1950).

376. "Acrylic lighthouses for Ford dealers," MODERN PLASTICS *27*, 64-66 (Aug. 1950).

377. "Giant color transparency," MODERN PLASTICS *27*, 129 (Aug. 1950).

378. "Skiing on plastics," MODERN PLASTICS *28*, 82-83 (Nov. 1950).

379. "Sun glasses adjust for light," MODERN PLASTICS *27*, 61 (Aug. 1950).

380. "Forming acrylic tableware for air liners," Brit. Plastics *22*, 64-69 (Feb. 1950).

381. "New patterns in stitchless quilted vinyl," MODERN PLASTICS *27*, 62-63 (Aug. 1950).

Properties

382. "Plastics in fabric coating," by D. S. Plumb, SPE J. *6*, 7-9 (May 1950).

383. "Ultra speed tensile of rubber and synthetic elastomers," by D. S. Villars, J. Applied Phys. *21*, 565-573 (Jan. 1950).

384. "An investigation of the mechanical properties of materials at very high rates of loading," by H. Kolsky, Proc. Phys. Soc. (London) *62B*, 676-700 (1949).

385. "Strength-variance studies of plastics," by W. J. Gailus, S. Yurenka, and A. G. H. Dietz, Trans. A.S.M.E. *72*, 299-307 (Apr. 1950).

386. "Some notes on the effect of testing machines on the tensile properties of plastic films," by L. Boor, ASTM Bull. No. 162, 46-53 (Dec. 1949).

387. "Long-time tension and creep tests of plastics," by C. E. Staff, H. M. Quackenbos, Jr., and J. M. Hill, MODERN PLASTICS *27*, 93-96, 98, 100, 144-145 (Feb. 1950): Trans. A.S.M.E. *72*, 697-704 (July 1950).

388. "Equivalent effects of time and temperature in the shear creep and recovery of elastomers," by F. S. Conant, G. L. Hall, and W. J. Lyons, J. Applied Phys. *21*, 499-504 (June 1950).

389. "Variation of elastic moduli and wave velocity with pressure and temperature in plastics," by D. S. Hughes, E. B. Blankenship, and R. L. Mims, J. Applied Phys. *21*, 294-297 (Apr. 1950).

390. "Stress phenomena from the respective viewpoints of solid-state and high polymer physics," by M. L. Huggins, J. Applied Phys. *21*, 518-519 (June 1950).

391. "Dynamic mechanical properties of rubber-like materials," by A. W. Nolle, J. Polymer Sci. *5*, 1-54 (Feb. 1950).

392. "Mechanical behavior of viscoelastic substances," by R. Sips, J. Polymer Sci. *5*, 69-89 (Feb. 1950).

393. "Dynamic elastic properties of some high polymers," by K. W. Hillier and H. Kolsky, Proc. Phys. Soc. (London) *62B*, 111-121 (1949).

394. "Method of measuring some dynamic elastic constants and its application to the study of high polymers," by K. W. Hillier, Proc. Phys. Soc. (London) *62*, 701-713 (Nov. 1949).

395. "Damping and resonant load-carrying capacities of polystyrene and other high polymers," by J. A. Sauer and W. J. Oliphant, A.S.T.M. Proc. *49*, 1119-1138 (1949).

396. "Some instruments for measuring the dynamic mechanical properties of plastic materials," by L. E. Nielsen, ASTM Bull. No. 165, 48-52 (Apr. 1950).

397. "Mechanical properties of oriented polystyrene film," by L. E. Nielsen and R. Buchdahl, J. Applied Phys. *21*, 488-493 (June 1950).

398. "Creep-time relations for polystyrene under tension, bending, and torsion," by J. Marin and G. Cuff, A. S. T. M. Proc. *49*, 1158-1180 (1949).

399. "Complex stressing of polyethylene," by I. L. Hopkins, W. O. Baker, and J. B. Howard, J. Applied Phys. *21*, 206-213 (Mar. 1950).

400. "The creep characteristics of compression molded polyethylene," by G. R. Gohn, J. D. Cummings, and W. C. Ellis, A. S. T. M. Proc. *49*, 1139-1157 (1949).

401. "Strength of heat-resistant laminated plastics up to 300° C.," by B. M. Axilrod and M. A. Sherman, J. Research NBS *45*, 65-84 (July 1950).

(Continued on p. 166)

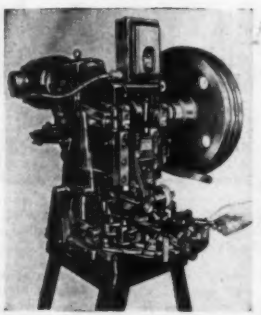
EVERY FACILITY
needed to produce
your MOLDS

ENGINEERING
DUPLICATING
ENGRAVING
HOBBING

Designers and Builders of Dies, Molds, Tools, and Die Casting Dies
•
Builders of Superior Molds for 25 years
•
Quotations Furnished. Write, Phone.

Beel Engineering Co.
411 MULBERRY ST., NEWARK 2, N. J.
MArket 2-3378-9

HOT STAMP



The Acromark No. 2A Hot Stamping Press can be set for marking speeds to suit either hand or mechanical feeds. The dial feed shown is hand loaded but automatically ejected. Hot stamping speed (in color) is about 58 units per minute. Automatic feed can double production if shape of plastic part lends itself to mechanical feeding.

Write to—
The Makers of a Full Line of Marking, Numbering and Hot Stamping Machines.

The ACROMARK Company
8-15 MORRELL ST., ELIZABETH 4, N. J.

How to extend supplies of scarce phenolics up to 30%

In molding materials and many other formulations where dark colors are satisfactory, Vinsol® Resin can replace up to 30% of the phenolic resin—without any appreciable sacrifice in physical or chemical properties. Currently priced at less than 5¢ per pound, this dark-colored, high melting thermoplastic also offers substantial savings in total resin costs. We'll send a generous quantity for testing, and gladly provide specific technical advice, if you'll tell us where you think "Vinsol" could conserve your phenolic supply.

HERCULES POWDER COMPANY, 916 Market St., Wilmington, Del.

for applications including

ADHESIVES

BONDING MATERIALS

COATINGS

IMPREGNANTS

LAMINATES

MOLDING PLASTICS

HERCULES Vinsol® Resin

NV50-6

402. "Impact on cap liners," by H. G. Steffens, Modern Packaging *23*, 121-125 (Nov. 1949).
403. "Tensile properties of some aircraft structural materials at various rates of loading," by R. F. Klinger, A.S.T.M. Proc. *50*, preprint (1950).
404. "Flexure testing of plastic materials," by J. W. Westwater, A.S.T.M. Proc. *49*, 1092-1118 (1949).
405. "An improved instrument for the evaluation of the physical properties of high polymer compositions," by I. Williamson, Brit. Plastics *23*, 87-90, 102 (Sept. 1950.)
406. "Low temperature stiffening of elastomers," by S. D. Gehman, P. J. Jones, C. S. Wilkinson, Jr., and D. E. Woodford, Ind. Eng. Chem. *42*, 475-482 (Mar. 1950).
407. "Elastomeric test films from acidic latices," by T. B. Blevins, W. S. Wright, and F. Leonard, Analytical Chem. *22*, 1205-1207 (Sept. 1950).
408. "Transitions in high polymeric materials," by R. Buchdahl and L. E. Nielsen, J. Applied Phys. *21*, 482-487 (June 1950).
409. "Second-order transition temperatures and related properties of polystyrene. I. Influence of molecular weight," by T. G. Fox, Jr. and P. J. Flory, J. Applied Phys. *21*, 581-591 (June 1950).
409a. "Second-order transitions and mesh distribution functions of cross-linked polystyrenes," by K. Ueberreiter and G. Kanig, J. Chem. Phys. *18*, 399-406 (Apr. 1950).
410. "A room-temperature transition in polytetrafluoroethylene," by H. A. Rigby and C. W. Bunn, Nature *164*, 583 (1949).
411. "Crystallization and second-order transition in silicone rubbers," by C. E. Weir, W. H. Leser, and L. A. Wood, J. Research NBS *44*, 367-372 (Apr. 1950).
412. "Thermal conductivity of homogeneous materials," by K. O. Beatty, Jr., A. A. Armstrong, Jr., and E. M. Schoenborn, Ind. Eng. Chem. *42*, 1527-1532 (Aug. 1950).
413. "Crystallization in high polymers. V. Dependence of melting temperatures of polyesters and polyamides on composition and molecular weight," by R. D. Evans, H. R. Mighton, and P. J. Flory, J. Am. Chem. Soc. *72*, 2018-2028 (May 1950).
414. "Hot penetration test for polyvinyl chloride compositions," by J. W. Clarke, Brit. Plastics *21*, 656-657 (Dec. 1949).
415. "Ignition and burning characteristics of polyester, phenolic, and melamine fibrous glass laminates," by H. J. Stark, ASTM Bull. No. 162, 55-58 (Dec. 1949).
415a. "A method and apparatus for determining the ignition characteristics of plastics," by N. P. Setchkin, J. Research NBS *43*, 591-608 (Dec. 1949).
416. "Thermal stability of polyester-styrene resin systems," by E. S. Ebers, W. F. Brucksch, P. M. Elliott, R. S. Holdsworth, and H. W. Robinson, Ind. Eng. Chem. *42*, 114-119 (Jan. 1950).
417. "Heat resistance of laminated plastics," by L. E. Sieffert and E. M. Schoenborn, Ind. Eng. Chem *42*, 496-502 (Mar. 1950).
418. "Effects of elevated temperatures on strength of thermosetting plastic laminates," by N. Fried, R. R. Winans, and L. E. Sieffert, A.S.T.M. Proc. *50*, preprint (1950).
419. "Heats of combustion of polythene and polyisobutylene," by G. S. Parks and J. R. Mosley, J. Chem. Phys. *17*, 691-694 (Aug. 1949).
420. "Heats of combustion and formation of cellulose and nitrocellulose," by R. S. Jessup and E. J. Prosen, J. Research NBS *44*, 387-393 (Apr. 1950).
421. "Heats of polymerization. A summary of published values and their relation to structure," by D. E. Roberts, J. Research NBS *44*, 221-232 (Mar. 1950).
422. "Estimation of crystallinity of some polymers from x-ray intensity measurements," by P. H. Hermans and A. Weidinger, J. Polymer Sci. *4*, 709-723 (Dec. 1949).
423. "Quantitative investigation of x-ray diffraction by 'amorphous' polymers and some other noncrystalline substances," by P. H. Hermans and A. Weidinger, J. Polymer Sci. *5*, 269-281 (June 1950).
424. "Modern microscopy of films and fibers," by F. F. Morehead, ASTM Bull. No. 163, 54-57 (Jan. 1950).
425. "Molecular weight investigations of high polymers with the electron microscope," by B. M. Siegel, D. H. Johnson, and H. Mark, J. Polymer Sci. *5*, 111-120 (Feb. 1950).
426. "Radiographic testing of filled plastics," by F. B. Shaw, Jr., Modern Plastics *28*, 123, 178, 180, 182 (Nov. 1950).
427. "Ultraviolet absorption spectra of some copolymers containing acenaphthylene, and of related compounds," by E. F. G. Herington and J. I. Jones, J. Polymer Sci. *4*, 725-733 (Dec. 1949).
428. "Photoelastic strain analyzer," by E. F. Smith and A. P. Wangsgard, J. Polymer Sci. *5*, 169-178 (Apr. 1950).
429. "Thickness gage for continuous sheet," Brit. Plastics *22*, 319-320 (June 1950).
430. "Dielectric fatigue of thermoset laminates," by N. A. Skow and C. A. Belsterling, Modern Plastics *27*, 93-94, 158, 160, 162 (July 1950).
431. "Random noise in dielectric materials," by R. F. Boyer, J. Applied Phys. *21*, 469-477 (June 1950).
432. "A method for evaluating the surface and volume resistance characteristics of solid dielectric materials," by W. G. Amey and F. Hamburger, Jr., A.S.T.M. Proc. *49*, 1079-1091 (1949).
433. "Equipment for the determination of insulation resistance at high relative humidity," by A. T. Chapman, ASTM Bull. No. 165, 43-45 (Apr. 1950).
434. "Effect on elastomers of Freons and other halohydrocarbons," by B. J. Eiseman, Jr., Refrig. Eng. *57*, 1171-1174, 1179, 1195 (1949).
435. "Effect of fuel-immersion on laminated plastics," by W. A. Crouse, M. Carickhoff, and M. A. Fisher, Trans. A.S.M.E. *72*, 175-188 (Feb. 1950).
436. "Resistance of representative plastic materials to hydrofluoric acid," by F. W. Reinhart and H. C. Williams, Jr., ASTM Bull. No. 167, 60-62 (July 1950).
437. "Permeability of polymeric films to organic vapors," by V. L. Simril and A. Hershberger," Modern Plastics *27*, 97, 98, 100, 102, 150-152, 154, 156, 158 (June 1950).
438. "Permeability of polymeric films to gases," by V. L. Simril and A. Hershberger, Modern Plastics *27*, 95-96, 98, 100, 102 (July 1950).
439. "Permeability of cellophane to liquids," by S. Madras, R. L. McIntosh, and S. G. Mason, Canadian J. Research *27B*, 764-779 (1949).
440. "Diffusion of some halo-methanes in polystyrene," by G. S. Park, Trans. Faraday Soc. *46*, 684-697 (Aug. 1950).
441. "Influence of structure of elastomers on their permeability to gases," by G. J. van Amerongen, J. Polymer Sci. *5*, 307-332 (June 1950).
442. "Electrical method for evaluation of protective coatings as moisture barriers," by M. A. Arthur, ASTM Bull. No. 160, 57-58 (Sept. 1949); Discussion, ibid., No. 166, 51-53 (May 1950).
443. "Sorption by organic substances. I. Krypton and nitrogen on polyethylene, nylon, and collagen," by A. C. Zettlemoyer, A. Chand, and E. Gamble, J. Am. Chem. Soc. *72*, 2725-2727 (June 1950).
444. "Analysis of data on plastics life tests," by W. L. Gore, Analytical Chem. *22*, 684-686 (May 1950).
445. "Low temperature autoxidation of hydrocarbons: The phenomenon of maximum rates," by A. V. Tobolsky, D. J. Metz, and R. B. Mesrobian, J. Am. Chem. Soc. *72*, 1942-1952 (May 1950).
446. "Quantum yields of decomposition products from the copolymer of vinylidene and vinyl chloride," by J. E. Wilson, J. Am. Chem. Soc. *72*, 2905-2908 (July 1950).
447. "Spectral characteristics of light sources for fading and degradation testing," by B. S. Cooper and F. S. Hawkins, J. Soc. Dyers and Colourists 65, 586-596 (Dec. 1949).
448. "Effect of fungus growth on the tensile

RECTO
Injection · Compression · Transfer Molding of PLASTICS *Since 1920*

Plastic products are developed from idea to completed product by RECTO

MOLDS MADE IN OUR OWN PLANT

RECTO MOLDED PRODUCTS, INC.
Custom Molders of Plastics Since 1920
CINCINNATI 9, OHIO MElrose 6852
DETROIT OFFICE: L. S. HOUSE
3-167 GENERAL MOTORS BLDG. TRINITY 5-5781

SCRAP AND VIRGIN Plastics
CUSTOM GRINDING
PROCESSING
CLEANING
GRADING
A. Schulman Inc.
SCRAP and VIRGIN Plastics
MAIN OFFICE AND PLANT: 790 E. TALLMADGE AVE., AKRON 9, OHIO
AKRON, OHIO • NEW YORK CITY • BOSTON, MASS. • JERSEY CITY, N. J. • E. ST. LOUIS, ILL. • HUNTINGTON PARK, CALIF.

NO MEASURING!
NO INVENTORY!
NO MESS!
Mix the contents of a sealed, pre-weighed package of JAMISON DRY COLOR MIX with 100 lbs. of crystal polystyrene. In 10 to 20 minutes you have standard colors . . . ready to mold!
JAMISON DRY COLOR MIXES give you:
• Consistent results . . . all ingredients carefully pre-blended . . . tested in over 6 years of molding-plant use.
• All standard colors . . .
• Special colors supplied on quantity orders.
• Sharply-cut labor costs . . . you can use most standard mixing equipment.
Send today for the full story of JAMISON DRY COLORS
Our Export Division is always ready to serve you
H. JAMISON PLASTICS
DRY COLOR DIVISION
11 W. 42nd St. New York, N. Y. - Plant Freeport, L. I., N. Y.

THEY GO TOGETHER . . !
Plastics and glass — combined with creative imagination and production skill they form a colorful trio designed to brighten America's luncheon tables and perk up sales for our client, Medco Silver Company of New York.
You'll want to talk with us, if you're considering a job which, like the Hostess Set above, calls for low-cost quantity with unvarying high quality. In our shop they go together, too.
CONNECTICUT PLASTIC PRODUCTS CO., INC.
70 West Liberty Street, Waterbury, Conn.

Calif. Dist.—Great American Color Co., 2512 W. 9th St., Los Angeles 6, Calif.

strength of polyvinyl chloride films plasticized with three plasticizers," by S. Berk, ASTM Bull. No. 168, 53-55 (Sept. 1950).

449. "Laboratory testing of the rain erosion resistance of aircraft finishes," by J. K. Grace and G. C. Frey, ASTM Bull. No. 168, 56-66 (Sept. 1950).

450. "Analysis of cellulose derivatives," by L. B. Genung, Analytical Chem. *22*, 401-405 (Mar. 1950).

451. "Coatings," by T. G. Rochow and R. W. Stafford, Analytical Chem. *22*, 206-210 (Feb. 1950).

452. "Natural and synthetic rubbers," by N. Bekkedahl, Analytical Chem. *22*, 253-264 (Feb. 1950).

453. "Qualitative analysis of synthetic resins used in leather finishes," by V. Pektor, Paint Technology *15*, No. 171, 105-107 (1950).

454. "Identification of dicarboxylic acids in polymeric esters," by R. W. Stafford, R. J. Francel, and J. F. Shay, Analytical Chem. *21*, 1454-1457 (Dec. 1949).

455. "Determination of dibasic acids in alkyd resins," by M. H. Swann, Analytical Chem. *21*, 1448-1453 (Dec. 1949).

456. "Determination of monomer in partially polymerized acrylic and allyl esters," by C. E. Albertson and I. R. MacGregor, Analytical Chem. *22*, 806-809 (June 1950).

457. "Determination of unsaturation of butyl rubbers and certain branched olefins," by T. S. Lee, I. M. Kolthoff, and E. Johnson, Analytical Chem. *22*, 995-1001 (Aug. 1950).

458. "Determination of free carbon in cured rubber stocks," by I. M. Kolthoff and R. G. Gutmacher, Analytical Chem. *22*, 1002-1003 (Aug. 1950).

459. "Creep behavior of plasticized polyvinyl chloride," by M. D. Ali, H. M. Mark, and R. B. Mesrobian, Ind. Eng. Chem. *42*, 484-488 (Mar. 1950).

460. "Use of electrical measurements to predict the mechanical properties of plasticized polyvinyl resins," by A. J. Warner, ASTM Bull. No. 165, 53-57 (Apr. 1950).

461. "Mechanical and electrical properties of plasticized vinyl chloride compositions," by L. E. Nielsen, R. Buchdahl, and R. Levreault, J. Applied Phys. *21*, 607-614 (June 1950).

462. "Dynamic mechanical properties of polymer-plasticizer systems," by L. Nielsen and R. Levreault, Nature *164*, 317-318 (1949).

463. "Studies in plasticization of polyvinyl chloride. I. Physical changes and their measurement," by M. L. Dannis, J. Applied Phys. *21*, 505-509 (June 1950).

464. "Studies in plasticization of polyvinyl chloride. II. Plasticizer variations in P.V.C.-plasticizer systems," by M. L. Dannis, J. Applied Phys. *21*, 510-513 (June 1950).

465. "Nitrocellulose-solvent interaction," by W. R. Moore, J. Polymer Sci. *5*, 91-109 (Feb. 1950).

466. "Salt effect in cellulose acetate," by C. J. Malm, L. J. Tanghe, and G. D. Smith, Ind. Eng. Chem. *42*, 730-734 (Apr. 1950).

467. "High polymer solutions. I. Vapor pressure of polystyrene solutions," by C. E. H. Bawn, R. F. J. Freeman, and A. R. Kamaliddin, Trans. Faraday Soc. *46*, 677-684 (Aug. 1950).

468. "Thermodynamic studies of polyvinyl acetate solutions in the dilute and moderately concentrated range," by G. V. Browning and J. D. Ferry, J. Chem. Phys. *17*, 1107-1112 (Nov. 1949).

469. "Mechanical properties of substances of high molecular weight. VI. Dispersion in concentrated polymer solutions and its dependence on temperature and concentration," by J. D. Ferry, J. Am. Chem. Soc. *72*, 3746-3752 (Aug. 1950).

470. "Mechanical properties of substances of high molecular weight. VIII. Dispersion of dynamic rigidity and viscosity in concentrated polyvinyl acetate solutions," by J. D. Ferry, W. M. Sawyer, G. V. Browning, and A. H. Groth, Jr., J. Applied Phys. *21*, 513-517 (June 1950).

471. "Intrinsic viscosity, translational, and rotary diffusion constants of rod-like macromolecules in solutions," by J. Riseman and J. G. Kirkwood, J. Chem. Phys. *18*, 512-519 (Apr. 1950).

472. "Behavior of polyvalent polymeric ions in solution," by A. Katchalsky, O. Künzle, and W. Kuhn, J. Polymer Sci. *5*, 283-300 (June 1950).

473. "Surface films of copolymers," by A. J. G. Allan and A. E. Alexander, Trans. Faraday Soc. *46*, 316-327 (Apr. 1950).

474. "Diffusion and swelling of high polymers. III. Anisotropic swelling in oriented polymer film," by G. S. Hartley, Trans. Faraday Soc. *45*, 820-832 (1949).

475. "Statistical mechanics of swelling of network structures," by P. J. Flory, J. Chem. Phys. *18*, 108-111 (Jan. 1950).

476. "Statistical mechanics of dilute polymer solutions. II." by P. J. Flory and W. R. Krigbaum, J. Chem. Phys. *18*, 1086-1094 (Aug. 1950).

477. "Note on the influence of structure on internal pressure in polymeric systems," by P. J. Flory, J. Chem. Phys. *18*, 112-113 (Jan. 1950).

478. "Light scattering from solutions of charged macromolecules," by P. Doty and R. F. Steiner, J. Chem. Phys. *17*, 743-744 (1949).

479. "Light scattering arising from composition fluctuations in multi-component systems," by J. G. Kirkwood and R. J. Goldberg, J. Chem. Phys. *18*, 54-57 (Jan. 1950).

480. "Light scattering in multi-component systems," by W. R. Stockmayer, J. Chem. Phys. *18*, 58-61 (Jan. 1950).

481. "Light scattering investigation of the structure of polystyrene," by P. Outer, C. I. Carr, and B. H. Zimm, J. Chem. Phys. *18*, 830-839 (June 1950).

482. "Investigation of the properties of nitrocellulose in solution by light-scattering methods. II. Results and interpretation," by R. M. Badger and R. H. Blaker, J. Phys. and Colloid Chem. *53*, 1056-1069 (1949).

483. "A study of the interaction of nitrocellulose with some solvents and nonsolvents by the light-scattering method," by R. H. Blaker and R. M. Badger, J. Am. Chem. Soc. *72*, 3129-3132 (July 1950).

484. "Viscosity of solutions of macromolecules," by R. Simha, Record of Chem. Progress *10*, 157-166 (Fall issue, 1949).

485. "Viscosity of polyvinyl chloride solutions," by J. W. Clarke, P. G. Croft-White, and P. J. Garner, Nature *164*, 450-451 (1949).

486. "Viscometer for thick liquids," by N. A. de Bruyne, Brit. Plastics *21*, 590-593, 626 (Nov. 1949).

487. "Cellulose ester viscosities by the ball-drop method," by C. J. Malm, L. B. Genung, and G. B. Lapham, Analytical Chem. *22*, 656-661 (May 1950).

488. "Viscosity and sedimentation of linear macromolecules with partial solvent immobilization," by A. Peterlin, J. Polymer Sci. *5*, 473-482 (Aug. 1950).

489. "Mechanical properties of high polymers as functions of the shape of the distribution curve. II. Controlled fractionation of ethyl cellulose," by P. C. Schere and R. D. McNeer, Jr., Rayon and Synthetic Textiles *30*, 56-59 (1949)

490. "Partition systems for the fractionation of nitrocellulose with respect to molecular weight," by M. C. Brooks and R. M. Badger, J. Am. Chem. Soc. *72*, 1705-1709 (Apr. 1950).

491. "Method of measuring molecular weight distribution," by F. W. Billmeyer, Jr. and W. H. Stockmayer, J. Polymer Sci. *5*, 121-137 (Feb. 1950).

492. "Pyrolysis of polymers," by W. S. Penn, Plastics (London) *15*, 18-21 (Jan. 1950).

493. "Report of A.S.T.M. Committee D-20 on Plastics," A.S.T.M. Proc. *50*, preprint (1950).

494. "Report of A.S.T.M. Committee D-14 on Adhesives," A.S.T.M. Proc. *50*, preprint (1950).

495. "Tentative test specifications and requirements for thermoplastic enclosures for electrical appliances," SPE J. *6*, 5, 10 (Apr. 1950).

496. "Plastics specifications in the Federal Government," by G. Reinsmith, ASTM Bull. No. 163, 78-80 (Jan. 1950).

THE PLASTISCOPE*

NEWS AND INTERPRETATIONS OF THE NEWS

By R. L. Van Boskirk

Low Cost Plasticizer

THE announcement by Socony-Vacuum Oil Co., Inc., 26 Broadway, New York, N. Y., that new facilities at Olean, N. Y., are now available to produce virtually unlimited quantities of S/v Sovaloid C should be of great interest to vinyl processors.

Sovaloid C is an aromatic petroleum plasticizer selling at less than 13¢ a pound. It has been in only limited production up to the present time.

In some applications, it is possible to use Sovaloid C without any other plasticizer, but it is generally recommended in combination with other plasticizers which help to give it better color effects. For example, if the vinyl compound in use requires 35 parts of plasticizer, from 4 to 6 of these parts could be Sovaloid C with little effect on color. If color is no problem, the amount of Sovaloid used can be increased; in fact, it might even be used to help increase the percentage of plasticizer and thus decrease the amount of resin. In such cases it becomes an extender for resin. One company is using a compound for belting that contains five plasticizers and includes Sovaloid C, particularly because it helps impart a high gloss.

Insofar as electrical properties and oil and water resistance are concerned, Sovaloid C will give better performance than most plasticizers, according to the producer. One of its outstanding properties, it is reported, is that it will not spew or migrate. Company officials say they have never been able to find a bona fide case of blooming when properly compounded. As one example, they point out that a sheet of vinyl plasticized with Sovaloid C has been held in contact with a cellulose nitrate lacquered surface for two years with no effect on either the vinyl or the cellulose nitrate. The plasticizer is not considered a highly volatile material. Significant volatilization does not occur at ordinary temperatures but would be noticeable at sustained temperatures above 150° F. Any volatilization which may occur at high temperatures would not leave a sticky or otherwise marred surface.

Sovaloid C has been successfully used with sheeting of 8-gage or more in thickness and many other types of vinyl, and, if heavily loaded with pigment, it is suggested for uses as in extruded beading, welting, channeling, etc. Vinyl floor tile manufacturers have been using Sovaloid C in large quantities. It is not recommended, however, for thin film of 4-gage or less nor for transparent material, pastel shades, or colors exposed to ultra-violet because it has a tendency to darken with age. It is satisfactory for wire coating compounds, in certain types of building wire which are not required to meet the Underwriters' Laboratories' heat test specifications.

This plasticizer has been found especially useful in plastisols where five to 10 parts more can be used than is customary with standard plasticizers. The user of Sovaloid C plasticized plastisols should be careful about light stability, but experimentation by individual processors may bring satisfactory results for their particular applications.

Melamine Tableware Standard

THE Commodity Standard Div. of the U. S. Department of Commerce, Washington, D. C., has just announced the acceptance of a commercial standard for melamine plastic tableware. Identified as CS 173-50 Heavy-Duty Alpha-Cellulose-Filled Melamine Tableware, the standard became effective Dec. 15, 1950.

The purpose of this standard, the second one ever to be established in the Plastics Industry (the first was for polystyrene wall tile), is to provide a yardstick upon which the quality of melamine tableware may be based. The standard serves as a guide to manufacturers, distributors, retailers, and consumers.

The standard covers chemical and physical properties and methods of test for the tableware. Included are such requirements as resistance to boiling water, thickness, finish, and resistance to dry heat.

Included with the standard is a hallmark which manufacturers of melamine tableware that meet the standard may mold right into each piece. It is also recommended that molders include the hallmark on all invoices, labels, literature, etc.

Another Chlorine Plant

A CHLORINE plant at Marathon, Ontario, Canada, capable of producing 25 tons of chlorine a day will be erected by Marathon Paper Mills of Canada, Ltd. The construction contract was signed recently by Marathon, Leonard Construction Co., Chicago, Ill., and Monsanto Chemical Co. De Nora mercury-type cells with a rated capacity of 30,000 amp. will be used.

Construction of another foreign plant by Monsanto was recently announced in London when it was stated that Monsanto would build a plant to manufacture styrene in Australia. It will be located at the company's Melbourne factory and will be large enough to satisfy all Australian requirements for styrene. No date was given as to when the construction would start.

Versatile Polymers

AVAILABILITY of polyvinyl pyrrolidone from its high pressure acetylene semi-works at Grasselli, N.J., has been announced by General Aniline & Film Corp. Specially treated polyvinyl pyrrolidone has been used as a synthetic blood plasma colloid in Europe during and since World War II. The polymers are now attracting considerable attention because of their possibilities in a variety of industrial applications.

Called Kollidon, the polyvinyl pyrrolidone dissolves in alcohol and other organic solvents as well as in water, and the polymers resemble albumin and gum arabic in their affinity for water and in certain other properties.

In addition to treatment of blood loss, shock, and severe burns, polyvinyl pyrrolidone solutions have been used as carriers, solubilizers,

* Reg. U. S. Pat. Office.

HELP NEEDED!
Profitable opening for a low cost material to be used in mass produced, lightweight, eye-appealing display racks. Material must satisfy decorative requirements, require minimum finishing and assembly operations, and maintain exact color matchings in eye-catching display racks. Apply to Institution and Restaurant Sales Manager, Kellogg Company, Battle Creek, Michigan.
Kellogg's
CORN FLAKES
PEP
RICE
BRAN FLAKES

STYRON solved this display problem!

Every day finds plastics at work improving more products faster and at lower costs. Recently, the Kellogg Company turned to plastics as the material best suited for their eye-catching display rack . . . a rack that is used to merchandise packaged cereals in restaurants, diners, etc.

To achieve the best results, the Kellogg Company turned their display rack requirements over to the Prolon Plastics Division of the Prophy-lac-tic Brush Company who have years of wide experience in the display field. The Kellogg Company's specifications called for a lightweight material with eye-appealing color that would make their display rack stand out at the point of purchase. The Custom Molder selected Styron (Dow polystyrene) for this job because it comes in a wide range of attractive colors . . . it is lightweight . . . and its many cost-saving and physical properties assured the molder of a quality material.

Through his custom molding know-how, the molder designed an ingenious single shot molded shelf. Shelves are tiered in any size desired by simply running two tubes through backs of shelves and cementing the shelves together. This technique lowered production costs to the Kellogg Company and resulted in a display rack easily adaptable to any merchandising situation.

STYRON CUTS FINISHING COSTS: No painting or finishing operations are required with Styron because surface color goes all the way through. Exact color matching is possible in each display rack. Finish stays bright and new looking because Styron's colors won't chip or peel.

SIMPLIFIES ASSEMBLY: Each display shelf is an identical single shot molding. This lowers production costs because final assembly involves only running two support tubes through back of four shelves and cementing shelves together. This feature gives added strength and rigidity to display rack.

IMPROVES DECORATIVE APPEARANCE: Styron has a wide range of sparkling colors that can be changed as frequently as desired with no additional production cost. Eye-catching, cut-out Kellogg's trademark is possible with Styron. Lightweight Styron permits ease of handling and lowers shipping costs.

Plastics Division—Dept. MSOT-14

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

New York • Boston • Philadelphia • Washington
Atlanta • Cleveland • Detroit • Chicago • St. Louis
Houston • San Francisco • Los Angeles • Seattle
Dow Chemical of Canada, Limited, Toronto, Canada

STYRON

DOW plastics

PLASTISCOPE

and retarding agents with drugs and other therapeutics, as well as thickeners for emulsions and solutions for cosmetic and veterinarian uses.

Grades of Kollidon have also been suggested as film-forming binding agents in photographic, printing, and finishing techniques, as mucilage-type adhesives, as sizes for paper, and as auxiliaries with dyestuffs.

Polyvinyl pyrrolidone and other polymers from nitrogen-vinyl compounds are among those reviewed in a forthcoming book by Dr. C. E. Schildknecht, "Vinyl and Related Polymers," to be published in the summer or fall of 1951 by John Wiley & Sons, Inc.

Consulting Chemists' Powwow

AT a dinner meeting held in October, The Consulting Chemists of New York, was taken to task for not knowing how to advertise and publicize its services. The scolding came largely from a speech by an executive representing an advertising agency handling chemical accounts, who has made an elaborate survey on the use and need for chemical consultants' services. He indicated that he thought "ethics" interfered far too much with practical promotion of the services of consultants in an industry which has become one of the world's greatest and where the need for special information is beyond all measure. He indicated that the association could at least tell its story as a group and attract attention to its members.

Spokesmen for the chemists, in rebuttal, came right back and implied that there were few people requiring the services of a chemical consultant who failed to find their man, and pointed out particularly that by far the largest part of their business came from firms other than chemical companies who needed consultation in a field with which they were not too familiar. The big chemical companies themselves, say the chemists, are overflowing with research men and technicians, and have no need to hire the special services of chemical consultants. Therefore, say the chemists, if they should decide to advertise their wares, they would have to spread their advertising and publicity over all branches of the industry, and any advertising they might do on a national scale would have to be spread too thin to accomplish any great purpose.

Consolidating Facilities

CONSTRUCTION of a 100,000 sq. ft. building in Chicago's Addison-Kimball district by J. Emil Anderson & Son, Inc., has been announced. The building, to be leased to American Cyanamid Co., will contain 80,000 sq. ft. of warehouse space on the first floor and 20,000 sq. ft. of air-conditioned offices on the second floor. Completion is scheduled for March 1951. The premises will be used to consolidate American Cyanamid's facilities in the Chicago area. At present the company occupies office and warehouse space at a number of locations. Among the units of the company which will use the new facilities when completed is the Plastics and Resins Division.

Progress on New Plant

PLANT manager of The Dow Chemical Co.'s new Styron plant now under construction at Allyn's Point, Conn., is K. E. Stober. He has been with the company since 1936. Other Midland personnel to transfer to the eastern plant in the fall of 1951 include J. Lloyd McCurdy, production superintendent; Frank Schubert, laboratory director in charge of inspection and control; and William Western, Jr., production foreman. Earl Appelquist has already assumed his new duties as chief accountant.

Silicone Compound

SILICONE rubber parts can now be molded easier and with highly improved mechanical and thermal properties with a new silicone rubber compound developed by the Chemical Dept., General Electric Co., Pittsfield, Mass.

Designated compound 81223, this new silicone rubber is outstanding for its ease in processing. Many parts can be fabricated from it without prolonged oven cure, and it is said to have excellent molding and extrusion properties after only a 5-min. warm-up. Because of the compound's outstanding hot-tear strength, parts with undercuts can easily be removed from molds; further, since G-E81223 is neutral in color, stock can be colored for product identification purposes for each fabricator.

Fabricated parts produced with this compound are said to have high tensile strength, high elongation, and excellent electrical properties, and are serviceable over the wide temperature range of 550 to -85° F.

Many new applications for silicone rubber mechanical goods, including diaphragms, boots, sleeves, belting, hose, and mountings are anticipated as a result of the improved molding characteristics and properties of this silicone rubber compound.

Plastics Television Show

THE first regular weekly television show to be devoted to plastics was inaugurated Dec. 5 over WNBT, sponsored by the Plastics Div., Monsanto Chemical Co. In a setting decorated with the newest Monsanto plastics materials, Jinx Falkenburg and Tex McCrary exhibited plastic toys for Christmas. Successive shows were built around home furnishings, plastic gifts for Christmas, and housewares.

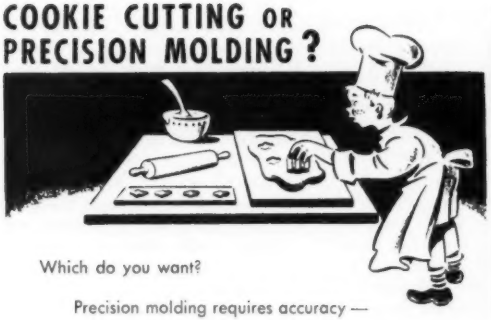
Billed as "Closeups," the television show will feature celebrities from stage, screen, and world affairs on each program.

Molded Polyester Glass

TO show the possibilities of a new polyester-glass fiber molding mixture, Molded Resin Fiber Co., Ashtabula, Ohio, has sent us a sample of a small bowl-like dish which was molded to test the material for flow and cure.

The dish is molded from a mixture of glass fiber flash run through a hammer mill, plus polyester resin and inert filler. R. S. Morrison, president of the company, says he believes his product is far stronger than any other thermosetting material of the same thickness. He does not offer the molding material for sale, but plans to use it for molding products in his own plant. He says that this material not only has higher tensile, flexural, and impact strengths than other molding compounds, but its moisture absorption

COOKIE CUTTING OR PRECISION MOLDING?



Which do you want?

Precision molding requires accuracy — experience — engineering — high technical skill — complete "know how" to design *your* piece, work out *your* problems, produce *your* piece to *your* complete satisfaction.

On the other hand, cookie cutting — well!

PLASTIC MOLDING CORPORATION
Custom Molders · Precision Molders
Sandy Hook Connecticut

Cold Mold • Hot Compression • Plunger Transfer • Injection

INORGANIC PIGMENTS *for plastics*

PERMANENT • DEPENDABLE
RESIST FADING AND HIGH TEMPERATURES
INSOLUBLE IN SOLVENTS and PLASTICIZERS

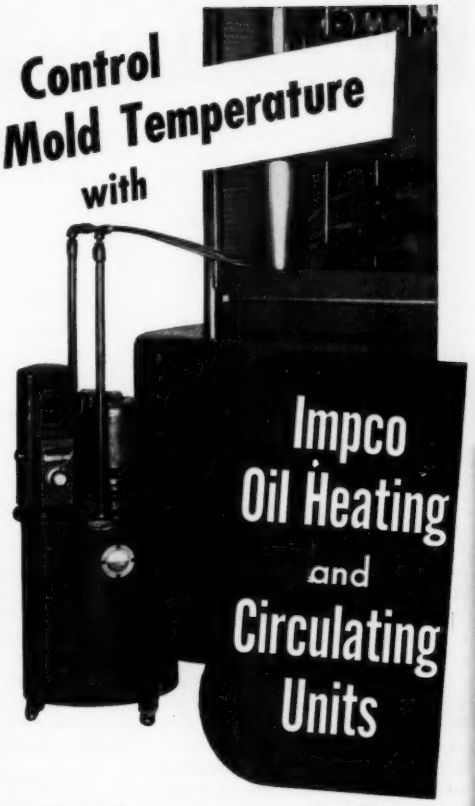
Suitable for
CASTING · INJECTION or COMPRESSION MOLDING · CALENDERED FILMS AND COATING PROCESSES

LET US KNOW THE APPLICATION

B. F. DRAKENFELD & CO., INC.
45-47 Park Place, New York 7, N. Y.

Drakenfeld

Control Mold Temperature with Impco Oil Heating and Circulating Units



The right temperature is absolutely necessary if rejects are to be kept at a minimum.

The Impco Unit automatically maintains a predetermined mold temperature by circulating heated oil through the mold at a constant rate. The oil is heated by a copper-sheathed, nickel-plated heating element and kept at the proper temperature by thermostatic control.

The Impco Unit is soundly engineered, ruggedly constructed and fully tested. It offers advantages in both injection and injection-compression molding . . . eliminates one source of shrink marks and weld lines . . . reduces strains within casting . . . in molding acetate more uniform density is obtained with less pressure.

Shipped from stock—write for sizes and prices.

PW-2

PLASTIC MOLDING MACHINERY DIVISION

Improved
PAPER MACHINERY CORPORATION
NASHUA, NEW HAMPSHIRE

PLASTISCOPE

and dielectric properties are excellent. In simple shapes he expects it to sell in the range of from 45 to 60¢ per pound molded. The first commercial product is a test switch cover, an item that had previously been made from heavy glass or metal.

Army Hut for the Arctic

UNDER test by the Army's Engineer Research and Development Laboratories at Fort Belvoir, Va., is a prefabricated cold-weather building, containing its own heating and sanitation facilities. Designed to withstand 100-m.p.h. winds and temperatures as low as -65° F., it is made up of 8-ft. side, roof, and floor panels with a honeycomb core, faced on both sides with an aluminum alloy. Primarily for troop use, the building has lightweight parts and can be quickly erected, even by relatively green troops.

The honeycomb panels of the Chrysler Prefabricated Arctic Building are fabricated by the Cycleweld process. The basic material is 60-lb. Kraft paper, impregnated with phenolic resin, under heat and pressure. When dried, the resin constitutes 20% of the total weight of the honeycomb. The cells of the honeycomb are approximately ½-in. diameter, and are of convolute formation. Adhesion to the aluminum skin panels is obtained through heat and pressure, applied by the Cycleweld process.

Shortages Bring Other Problems

SHORTAGES of materials and manpower will bring to the plastics industry another great problem —that of misapplication and poor workmanship, according to S. L. Brous, marketing manager of General Electric Co.'s Chemical Dept.

Mr. Brous thinks the second problem is even more dangerous than the first in regard to long-range growth and prosperity of the plastics industry, and points out that the plastics industry had just overcome the adverse reaction at consumer level to plastics materials for functional services which resulted from the all-too-frequent use and reference to plastics as substitutes. Perhaps neither the materials manufacturers nor the processors can fully control the supply and disposition of plastics materials, says Mr. Brous, but both groups can exert influence over the end users to which available materials may be directed. He insists the industry must resist impulses and pressures which will result in lowered quality of its products.

Testing Flexibility

THERMOSETTING plastic components laminated by Synthane Corp., Oaks, Pa., are now being furnished with pre-determined flexibility for applications where pliancy is an important property. Installation of a highly sensitive Olsen stiffness tester in the company's new laboratory permits detection of small variations in elasticity, brittleness, toughness, and plastic flow. Values can be determined similarly for any application in which the laminate must withstand bending stresses within definite limits.

Vinyl Upholstery

BOTH traditional and contemporary furniture can be attractively upholstered in any of the three new vinyl fabrics recently introduced by The Pantasote Co., New York. "Pigskin," in seven colors, simulates fine English glove-quality pig, deeply grained. "Texas" has a warm deep toning, and comes in 13 colors. Both are suitable for living room furniture, particularly large pieces. "South Seas," marketed in six colors, was derived from straw braiding, and is intended primarily for dinettes, small occasional pieces, and summer furniture. All three fabrics come in standard thicknesses and are 54 in. wide.

Lead Stabilizer

CALLED Witco Lead Stearate #50, a lead content primary heat stabilizer and internal lubricant for polyvinyl chloride resins and copolymers has been announced by Witco Chemical Co., 295 Madison Ave., New York 17, N.Y. It is asserted that the new stabilizer will fulfill the total heat protective requirements of most vinyl compounds where lead salts are suitable.

The new lead stabilizer contributes ease of extrusion, mold flow, and release from hot roll and mold surfaces, properties which are not always obtainable through the usual inorganic lead salt stabilizers, according to the company. Applications for the new stabilizer include use in either translucent or opaque items, such as phonograph records, insulated wire, garden hose, film, and sheeting. Lead Stearate #50 does not melt at mixing temperatures, but disperses in the resin in solid particle form, similar to a pigment, thereby reducing to a minimum the possibility of stabilizer spew or surface bloom.

Two-Mil Calendered Film

AVAILABILITY of 0.002-in. (2-gage) calendered unsupported vinyl film has been announced by Ross & Roberts, Inc., manufacturer of vinyl film and sheeting at Stratford and West Haven, Conn. The company claims that this is the first time anyone has been able to offer a 0.002-in. calendered unsupported vinyl on a commercial scale.

In the experimental stage for several months, manufacture of the film was finally accomplished by new developments in calendering techniques and equipment which made it possible to enjoy the material economy of a thin film while still retaining the advantages of a calendered product. It is available in a variety of colors. Distribution is being handled through Ross & Roberts Sales Co., Inc., 350 Fifth Ave., New York 1, N.Y.

Ethiopia Seeks U.S. Market

THE Ethiopian Government is interested in developing a market in the United States for veneers of certain woods known as Kosso (Hagenia abyssinica) and Zigba (Ekbergia rupeliana). Both types can be supplied in sheets 1.95 by 0.97 meters with a thickness of either 3 or 5 millimeters.

One sample of each type is obtainable on a loan basis from the Commercial Intelligence Branch, U.S. Dept. of Commerce, Washington 25, D.C.

Interested importers may communicate with the Imperial Ethio-

CELLULOSE ACETATE

Molding Powders

Franklin Jeffrey has just placed in operation a new production line for the manufacture of cellulose acetate molding powders

all colors ***all flows***

For your convenience Franklin Jeffrey maintains complete facilities for custom compounding acetate and for reclaiming your scrap materials.

Mr. J. S. Brody has recently assumed ownership of this organization

FRANKLIN JEFFREY CORPORATION

Manufacturers of Plastics

1671 McDonald Avenue Brooklyn 30, N. Y.

See Sinko for NYLON MOLDINGS

Because we've had many years experience in molding with this tough, shock and wear-resistant material. We have precision-molded countless thousands of fine gears, bushings, washers, skid blocks, rollers, rivets, etc., in our complete and most modern plant.

Sinko also molds all other thermoplastic materials with equal precision and care; and the many leading manufacturers we serve today attest to our ability to accurately produce the most intricate injection molded products, and metal-plastic assemblies.

It will pay you well to acquaint yourself with our engineering and molding facilities . . . **WRITE TODAY!**

Sinko MANUFACTURING & TOOL CO.
3135 W. GRAND AVENUE • CHICAGO 22, ILLINOIS

AUTOMATIC

This 880-ton R. D. Wood hydraulic platen press is designed for precision polishing and laminating of plastic sheets. Press platens measure 44" x 54". Equipped with a loading and unloading elevator of 20 openings (twice the number of press openings) the press is completely automatic. Adjustable control of operating cycle, pressure application, platen heating and cooling temperature are all controlled from a central panel board at the operator's station. A recorder automatically records actual temperature and pressure during the entire operating cycle. This precision press provides the extreme accuracy, positive pressure and temperature control required for repetitive production of exactly uniform sheets, in conformance with the most rigid specifications of thickness, flexibility, and coloring.

Different size and pressure ranges are available. Write without obligation for information.

HYDRAULIC PRESSES AND VALVES FOR EVERY PURPOSE
ACCUMULATORS ENSIFIERS

Est. 1803 *R. D. Wood Company*

PLASTISCOPE

pian Ministry of Commerce and Industry, Addis Ababa, Ethiopia, which will welcome any recommendations or comment as to the potentialities of these products.

Alkyd Resin Plant

A NEW alkyd resin production plant at Toledo, Ohio, is being designed and constructed for Plaskon Div., Libbey-Owens-Ford Glass Co. by Chemical Plants Div., Blaw-Knox Co. This new facility will increase production capacity for the firm's new alkyd molding compounds which are being used increasingly for plastics parts in the electrical, automotive, and electronic industries. The plant is expected to be in production by March, 1951.

British Styrene

IT has just been brought to our attention by Styrene Products, Ltd., London, Eng., that the report on styrene production in the United Kingdom, appearing on page 146 of our September 1950 issue, was in error. The polystyrene program in question is being undertaken by Petrochemicals, Manchester, in connection with Erinoid Ltd., under the name of Styrene Products Ltd. Petro-Carbon Ltd., mentioned in our September report, is a research, development, design, and construction company. Neither Petro-Carbon nor Petrochemicals is in any way linked with the Shell group.

Production of polystyrene at Manchester by Styrene Products Ltd. is just beginning. For the time being imported monomer is being used, and monomer will not be produced in Manchester using benzene and ethylene supplied by Petrochemicals for about two more years.

FINANCIAL

Modglin Co., Inc., Los Angeles, Calif., reported net profits after taxes for the first half of its fiscal year 1950 of $48,070.90. The first half shows approximately the same net profit for the comparable period in 1949. Sales volume is expected to show an increase during the final half of 1950 because of experimental activity being conducted for several government agencies.

Dewey & Almy Chemical Co. reports net earnings of $1,421,433 for the nine months ending Sept. 30, 1950, in comparison to net earnings of $556,160 for the same period in 1949. Net sales for the first nine months of the year reached an all-time high of $15,482,804.

Formica Co. has announced a profit of $1,623,214 for the first nine months of 1950 compared with $1,018,242 in a similar period last year. Net sales increased to $14,051,792 from $9,783,985 a year ago.

Hercules Powder Co. reported sales for the first nine months of 1950 as $113,906,310 compared with $89,659,952 in the corresponding period of 1949. The physical index of goods sold in the first nine months was 30% higher, and net sales prices averaged 2% lower than in the corresponding period of 1949.

Monsanto Chemical Co.'s consolidated sales for the nine months ending Sept. 30, 1950, totaled $163,271,934, or approximately 35% greater than sales for the same period a year ago. Net earnings for the same 1950 period were $20,762,781 compared to $11,555,833 for the first nine months of 1949.

COMPANY NOTES

Magnus Harmonica Corp., Newark, N. J., has appointed **The Rivers Co.**, Memphis, Tenn., as southern representative.

A. Bamberger Corp., dealer and reprocessor of thermoplastic materials and plastics scrap, has moved to larger quarters at 703 Bedford Ave., Brooklyn, N. Y. **American Molding Powder & Chemical Corp.**, an associate company, will also occupy offices at the same address.

Harwick Standard Chemical Co., Akron 5, Ohio, has announced the availability of Stellar-R Clay and Stan-Clay for use in extending titanium and lithopone which are two of the tightest chemicals in existence today. These two materials have already proved efficient pigments in allowing the reduction of titanium dioxide and lithopone. They have no covering power in themselves, but their whiteness will enable the compounder to extend his supplies of titanium over a larger poundage and, at the same time, show a compound cost saving.

Frank W. Egan & Co., Bound Brook, N. J., machinery manufacturer, has acquired additional building space at 115 Lincoln Blvd. to take care of its expanding design and drafting departments and laboratory for converting and drying equipment. The export division of the company, formerly situated in New York City, is now operating at the new Bound Brook address.

Majestic Molded Products, Inc., has moved its plant and offices to larger quarters at 845 E. 138th St., Bronx 54, N. Y.

Columbia Cellulose Co., Ltd., Canadian subsidiary of **Celanese Corp. of America**, has appointed **Bulkley, Dunton Pulp Co., Inc.**, selling agent for the market pulp of its plant near Prince Rupert, B. C., which will come into production early next year.

The Dow Chemical Co. has started construction of a new addition to the plastics building at Midland, Mich., for increased production of Styron. The new building is to be completed early next fall. Two other plants at Allyn's Point, Conn., and Los Angeles, Calif., have been planned for the production of this material.

Fisher Scientific Co. has opened a new service plant at 7722 Woodbury Dr., Washington, D. C. The new laboratory distribution center provides large stocks of scientific instruments and apparatus which are essential to defense programs. Said to be the largest manufacturer of laboratory equipment in the United States and Canada, Fisher conducts its business largely by mail. It is a "technical Sears Roebuck" with some 100,000 laboratory clients in the fields of chemistry, metallurgy, biology, and so forth.

General Electric Co. has announced the following appointments: **Austen W. Boyd** is in charge of the **Chemical Process Development** group at Waterford, N. Y.; **John T. Castles** is manager of that group's

CLAREMONT

MACERATED COTTON FABRIC FILLER

REELING SUCCESS WITH MELMAC★

Light in weight, tough Melmac 3020, a chopped cotton-filled melamine-formaldehyde molding compound, is the material that the Zero Hour Bomb Company of Tulsa, Oklahoma selected for the spinner head on their new Zebco reel. This formulation offered high impact strength, a smooth surface and excellent resistance to water. The Melmac spinner head is molded by Reliable Plastics Company and the casting reel retails for $17.50.

★ Excerpt from current news release issued by American Cyanamid Co., New York, producers of Melmac 3020 molding compound.

Of all the muscle-building ingredients used by plastics materials manufacturers, Claremont Cotton Fillers have proven most satisfactory! Claremont produces four graduated-strength types of fillers (Flock, Thread, Fabric, Cord). Many millions of pounds of Claremont Fillers are already doing their share to make many millions of plastic parts functionally strong! Claremont Fillers in neutral, black or color and in quantities sufficient for your laboratory test runs are available upon request. Write today for complete details.

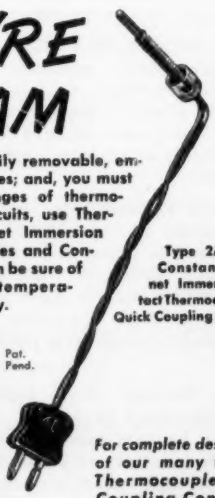
CLAREMONT WASTE MFG. COMPANY
The Country's Largest Manufacturer of Flock
CLAREMONT, NEW HAMPSHIRE

EEMCO mills and presses are built by expert craftsmen for long life and heavy duty. Get EEMCO prices and shipping dates before you buy. Send for bulletins on mills and presses, today.

EEMCO *Erie Engine & Mfg. Co.*
955 EAST 12th ST., ERIE, PENNA.
RUBBER and PLASTICS MACHINERY DIVISION

THEY'RE A TEAM

When you need readily removable, embedded Thermocouples; and, you must make frequent changes of thermocouple-pyrometer circuits, use Thermo Electric's Bayonet Immersion Contact Thermocouples and Connector Panels. You can be sure of obtaining accurate temperature readings, quickly.



Type 2A07D Iron Constantan Bayonet Immersion Contact Thermocouple with Quick Coupling Connector.

Pat. Pend.

Type JBW Connector Panel with FS Conduit Box for 1, 2, 3, 4 or 5 thermocouple circuits.

For complete descriptions of our many types of Thermocouples, Quick Coupling Connectors, Panels, Lead Wires and Accessories, Write for Catalog P

Thermo Electric FAIR LAWN NEW JERSEY

PLASTISCOPE

silicone plant; and **Robert A. Hoffer** has been named engineering manager for the **Plastics Div.** of the **Chemical Department.**

Baker Castor Oil Co. has announced the following appointments: **Donald S. Bolley** as director of research; **M. Kent Smith** as director of development; and **Russell Hayes** as chief of the engineering department.

United Plastic Industries, Inc., 1300 Water St., Vassar, Mich., has announced an expansion program of new buildings and molding and finishing equipment to be completed in the beginning of 1951.

Plastics Specialties Co., Inc., 1310 West Road, Trenton, Mich., has appointed **Chase Sales Co.,** 450 Maple Court, Hayward, Calif., as West Coast representative to handle the company's line of Lamiply laminating grades.

Monroe Plastics Co., Inc., Rochester, N. Y., has named Max Silverman of **Broadcast Specialties Co.,** 120 W. 42nd St., New York, N. Y., as exclusive national sales representative.

Owens Brush Co., 901 Buckingham St., Toledo, Ohio, a subsidiary of **Owens-Illinois Glass Co.,** broke ground for a building project which will increase present facilities 65% and will house an expanded molding department.

Bjorksten Research Laboratories, Inc., Chicago, Ill., has announced that **Edward G. Appel, Kenneth L. Sayre,** and **Gordon W. Andersen** have joined the staff. Mr. Appel will be engaged in the application of metallographic techniques in plastics research.

Teflon Products Div., United States Gasket Co., P. O. Box 93, Camden, N. J., has announced it is now fabricating all types of Teflon insulators for high-voltage, high-temperature, and high-frequency service in T.V. transmitters, radio, radar, and other electrical equipment.

Burgess Pigment Co., 64 Hamilton St., Paterson, N. J., has announced that **California Warehouse,** 1248 Wholesale St., Los Angeles 21, Calif., is now carrying stock of products which are available through **Merit Western Co.,** also of Los Angeles.

Hartford-Empire Co. has appointed **Clarence W. Coe,** former president of Shaw Insulator Co., as general manager of the **Stonington Div.,** and **J. H. DuBois,** former vice president of Shaw, as manager of the new product development branch of **Plax Corp.,** a subsidiary of Hartford-Empire.

The Fiberite Corp., Winona, Minn., has announced that **John David** has been named general manager, and **Paul A. Bury** has joined the firm as research and development director.

P. R. Mallory Plastics, Inc., 3670 Milwaukee Ave., Chicago 41, Ill., is the new name of **P. R. Mallory & Co., Inc.,** which recently purchased **Plastic Molders, Inc.,** Chicago. Facilities and operating personnel will remain unchanged.

Koppers Co., Inc., Pittsburgh 19, Pa., has announced the following personnel changes: **J. N. Forker,** vice president and general manager of the **Tar Products Div.,** will retire, and will be succeeded by **Fred C. Foy; John B. Keeler** has been named a vice president; and **Dr. William C. Dearing,** former director of research for the Plaskon Div., Libbey-Owens-Ford Glass Co., has joined the **Research Department.**

George Woloch & Co., 61 Broadway, New York, N. Y. is a new company formed to deal in scrap and crude rubber as well as plastics scrap. Mr. Woloch was formerly with A. Schulman, Inc., and H. Muehlstein & Co.

Eastern Plastics, Inc., Kenwood Ave., Fairfield, Conn., is the new name of **Eastern Tool & Die, Inc.**

Industrial Plastics Co. has moved to larger quarters at 90 Commerce St., New Haven 11, Conn.

Krieger Color & Chemical Co., Los Angeles, Calif., maker of Poly-Supra dry colors, announces that its experimental color laboratory is now available for use by molders. The complete facilities, including molding units for duplication of actual plant conditions, will be used for solving individual color problems. The company reports that it has developed more than 1700 colors. These dry colors are available either prepacked, ready to use for 100 lb. of crystal, or in bulk.

Johnson Plastic Corp., manufacturer of Johnsonite plastic pipe and extruded plastic industrial products, has purchased additional facilities in Chagrin Falls, Ohio.

Monsanto Chemical Co. has announced the following personnel changes: **Sumner F. Goldthwaite** has been named assistant purchasing agent for the **Merrimac Div.; Thomas J. Diviney** has been appointed assistant to the general manager and director of personnel relations of the same division; and **William H. Winfield** has been elected assistant treasurer of the company.

F. J. Stokes Co., Philadelphia, Pa., has launched a $700,000 expansion program, adding one third in space to its present plant. Completion is scheduled for early 1951.

Heyden Chemical Corp. has announced it will spend $1,175,000 for additions to existing facilities at its Garfield, N. J., plant.

Steiner Plastics Mfg. Co., Inc., is moving to a new plant at Pratt Oval, Glen Cove, N. Y., which will triple the company's manufacturing space to 75,000 square feet. The firm will maintain its present offices at 47-30 33rd St., Long Island City, N. Y., until the end of 1951.

Stauffer Chemical Co. has announced that when its Niagara Falls, N. Y., plant is completed early next year, production of chlorine and caustic soda will be nearly doubled.

PERSONAL

William N. Modglin, president of **Modglin Co., Inc.,** Los Angeles, Calif., manufacturer of plastic brushes and combs, is leaving for the Far East where he will visit Japan, Hong Kong, Australia, and other countries in that area in the interest of his company's business. The primary purpose of his visit, says Mr. Modglin, is to instigate final plans for the construction of a manufacturing plant in the Philippine Islands where he can more adequately service Far Eastern

M&M plastic granulator

In today's market the use of every available piece of scrap has become increasingly important. The M & M Plastic Granulator designed for "on the job grinding" can turn the material from your scrap barrel into usable granules and extra profit. Investigate today!

mitts & merrill
1016 South Water • SAGINAW, MICHIGAN

S.S.WHITE *Elastoplastic*

PLUGS *and* CAPS

Slipped into or over the ends of plain tubing, these plugs and caps protect the ends and keep out dirt and moisture.

Made of flexible Vinylite plastic, they are resistant to most oils, offer high electrical insulation, and are easily applied and stay put. For details,

WRITE FOR BULLETIN P-4704.

THE S.S.White DENTAL MFG. CO. PLASTICS DIVISION
Dept. M 10 East 40th St. NEW YORK 16, N. Y.

Save your workers' hands with JOMAC GLOVES

Jomac Work Gloves and Jomac Heat-Resistant Work Gloves are the best for handling hot tools, dies, and materials. Our Jomac special fabric insulates hands against heat or cold. These gloves protect against rough or sharp edges. Do not snag or tear. Do not slip when oil-soaked. Outwear ordinary work gloves 7 to 1.

REVERSIBLE—Jomacs fit either hand. Any two make a pair.

WASHABLE—Jomacs can be used over and over.

FLEXIBLE—Jomacs stay flexible after repeated washing or cleaning. Flexible Jomac Gloves speed up production.

Send in coupon for trial order at gross price.

C. WALKER JONES CO.
6128 Woodstock St., Philadelphia 38, Pa.

Please send me a trial order.

☐ One dozen pairs of Jomac Work Gloves (No. 666) at $6.50 postpaid.

☐ Free folder on Jomac Gloves and Hand Guards.

Name_____

Company_____

Address_____

City_____ Zone____ State____

☐ Ship open account ☐ Check enclosed ☐ C.O.D.

PLASTISCOPE

requirements. The proposed factory will be capable of producing approximately 2 million combs per month in addition to its regular line of hair brushes, soap boxes, and other items.

Frank Bell has been named staff representative of Hycar American rubbers for **B. F. Goodrich Chemical Co.**, Cleveland, Ohio.

Arthur L. GeWertz, 521 Fifth Ave., is now New York representative for **Krieger Color & Chemical Co., Inc.**, 6531 Santa Monica Blvd., Los Angeles 38, Calif., which manufactures Poly-Supra colors for dry-coloring thermoplastics.

Vincent R. Tearle, formerly vice president of Clear Pak, Inc., has been appointed sales manager of the transparent container division of **Alexander Rudnick & Son**, 476 Broome St., New York 13, N. Y.

Walter L. Hardy has been named vice president of the **Specialty Package Div., Leeds Sales Co., Inc.**, 294 Fifth Ave., New York, N. Y. and general manager of **Leedpak, Inc.**, a subsidiary specializing in rotogravure printing of papers, films, and foil.

Gordon Porterfield is the New York sales representative for **The Baldwin Locomotive Works**, Philadelphia 42, Pa.

Ray Hardt has been named general manager of **Plastic Metal Mfg. Co.**, 3550 N. Spaulding Ave., Chicago 18, Ill.

Robert G. Luskin, has been transferred to the Los Angeles sales staff of the **Chemical Div., The Goodyear Tire & Rubber Co.**, Akron, Ohio.

George L. Fenn, secretary and assistant treasurer of **Adamson-United Co.**, has been elected to the firm's board of directors. He has been with the company for 10 years.

Charles M. Holmes, assistant manager of **The Quaker Oats Co.'s** Memphis, Tenn., chemical plant, has been named manager of the chemical plant to be built in Omaha, Neb. This plant is expected to be producing furfural by the end of 1951.

Frank M. Hall has been appointed plant superintendent for **Acheson Colloids Corp.**, Port Huron, Mich. He has been with the firm since 1919.

Stanley Bindman has been elected vice president and director of **The Jamison Plastics Corp.**, 71 East Sunrise Highway, Freeport, L. I., N. Y.

Raymond Szymanowitz has been elected a director of **Acheson Colloids, Ltd.**, London, England, the British affiliate of **Acheson Colloids Corp.**, Port Huron, Mich., manufacturer of colloidal dispersions. Mr. Szymanowitz, with the firm since 1924, has been technical director since 1938.

Ralph F. Chambers, formerly president and general manager of Plastics Productions, Inc., New Orleans, La., has been named a sales representative for **Pan American Plastics, Inc.**, Dallas, Texas.

James F. Hamilton, president of **Forest Products Research Society**, has been appointed manager of laminating operations for **M. Murphy & Son, Inc.**, Ellicottville, N. Y.

Jerome S. Stanford, formerly general superintendent of Monsanto Chemical Co.'s Plastics Div. at Springfield, Mass., is now works manager of **The Borden Co.'s Durite Plastics Div.** at Philadelphia, Pa.

William A. Bohlander has been named factory manager of **The Hydraulic Press Mfg. Co.**, Mount Gilead, Ohio. He was previously associated with Aetna Standard Engineering Co.

Joseph P. Healey has been named eastern sales manager for **Manco Products Co.**, Melvindale, Mich., fabricator of precision castings for plastic molds.

George R. Siegrist, executive vice president, treasurer, and director, is retiring from **Acheson Colloids Corp.**, Port Huron, Mich.

Charles H. Cox, Jr., has been appointed purchasing agent for **Synthane Corp.**, Oaks, Pa. He has been with the firm for 16 years.

Edward W. Gamble, Jr., has been named assistant to **Francis J. Curtis**, vice president and director of industrial preparedness for **Monsanto Chemical Co.**, St. Louis 4, Mo. **Chester L. Jones, Jr.**, succeeds Mr. Gamble as acting manager of textile chemicals sales.

R. G. Heiligmann has been named supervisor of the **Plastics Div.** at **Battelle Memorial Institute**, Columbus, Ohio. He has been with the organization for four years conducting research activities in the high-polymer field.

William H. Wilson has been named president of **Wil-pak Packing Products, Inc.**, Empire State Building, New York 1, N. Y. The firm specializes in moisture-vapor-proof bags, water-proof case liners, and allied packing materials for government and commercial applications.

Dr. F. Dudley Chittenden has been named factory manager of **United States Rubber Co.'s** Marvinol vinyl resin plant at Painesville, Ohio. He was formerly development manager of the firm's Naugatuck Chemical Division.

MEETINGS

Jan. 25—Worcester-Leominster Chapter Meeting, The Society of the Plastics Industry, Sterling Inn, Sterling, Mass.

Feb. 28-Mar. 2—Reinforced Plastics Div. Meeting, 6th Annual Technical Session, The Society of the Plastics Industry, Edgewater Beach Hotel, Chicago, Ill.

Mar. 5-6—Annual Meeting, The Society of the Plastics Industry (Canada), Inc., Mount Royal Hotel, Montreal, Quebec.

Mar. 5-9—American Society for Testing Materials, Spring Meeting, Cincinnati, Ohio.

Mar. 13-16—National Association of Corrosion Engineers, 1951 Conference and Exhibition, Hotel Statler, New York, N. Y.

Apr. 17-20—American Management Association, 20th National Packaging Exposition, Auditorium, Atlantic City, N. J.

S.P.E. Meetings

Feb. 12—Upper Midwest Section of S.P.E. at Esslingers' Cafe, 1927 University Ave., St. Paul, Minn. A discussion of "Polyethylene Molding and Coating" will be arranged by J. H. Kugler.

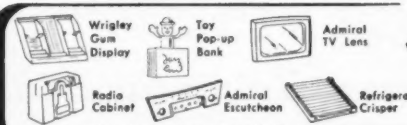
in

Precision Plastic Molding
VICTORY would do the job
COMPLETE!

Put Victory's *complete* facilities to work for you . . .

- **ENGINEERING**—Victory's staff of engineers includes specialists in the mechanical, electrical and chemical fields.
- **MOLD MAKING**—Victory's complete and modern tool room is supervised by men with over 30 years' "Know-How" specializing in injection molds.
- **INJECTION MOLDING**—Victory's ultra-modern, high-speed equipment, newly expanded production facilities, and competent use of controlled molding techniques assure top quality.
- **ASSEMBLY**—Victory's conveyor line operation guarantees top speed and economy on plastics as well as the most complex electro-mechanical assemblies.
- **FINISHING**—Victory's up-to-date automatic paint spraying, hot stamping and silk screening equipment gives you custom-finish jobs at production line prices.
- **ATTENTION: SALES ORGANIZATIONS**—Victory will manufacture and package your product, individually and in multiple-unit cases, preparing it for immediate shipment to your customers.

"All operations under one roof" saves you time, effort and money. Let us help you with your thinking. Contact us NOW!



Examples of Victory's Precision Plastic Molding

VICTORY MANUFACTURING COMPANY
1726 West Arcade Place • Chicago 12, Illinois
ESTABLISHED IN 1930

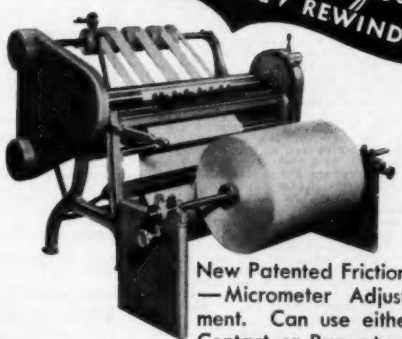
Up to 60-ounce Shots

HOMMEL
INORGANIC PIGMENTS FOR *Plastics*
UNIFORMITY · STABILITY · BRILLIANCY ·

60 years of manufacturing experience.
Write us and tell us your application and we'll submit samples for your inspection and approval.

THE O. HOMMEL COMPANY
PITTSBURGH 30, PA.

THE *Jacques* SLITTER and REWINDER



New Patented Frictions—Micrometer Adjustment. Can use either Contact or Razor-type Cutters. Mill Rolls up to 45" width and 40" diameter. Automatic tension gives better quality work.

HOBBS MANUFACTURING CO.
25 Salisbury St., Worcester 5, Mass.
EST. 1882

Manufacturers of
JACQUES Hand and Power Shears,
TRI-POWER Die Presses, Paper Box Machinery, and
TOUCH-O-MATIC Paper Cutters.

CLASSIFIED ADVERTISEMENTS

MODERN PLASTICS reserves the right to accept, reject or censor classified copy.

EMPLOYMENT • BUSINESS OPPORTUNITIES • EQUIPMENT (used or resale only)

Machinery and Equipment FOR SALE

FOR SALE: 50 Ton Stokes Presses & Pump. 200 Ton W.S. Hobbing PRESS, 300 Ton W.S. PRESS 24 x 20 Platen, 175 Ton H.P.M. PRESS 30 x 30 Platen, 150 Ton Farrel PRESS 30 x 30 Elec. Plates. 140 Ton W.S. PRESS 23 x 17 Platens, 85 Ton Stewart Boiling PRESS 20 x 20 Platen. 50 Ton Elmes PRESS with 18 x 18 Elec. Plates, 75 Ton W.S. PRESS 15 x 15 Platen, 75 Ton Adamson PRESS 20 x 20 Platens. Laboratory Presses. Accumulators. Piston and Oil Pumps. AARON MACHINERY CO., INC. 45 Crosby St., N.Y.C.

FOR SALE: Thermex Preheater, Model 2P: Airtronics Preheater, Model D E: Airtronics Preheater, Model C B. Like new. AARON MACHINERY CO., INC. WOrth 4-5233 45 Crosby St., New York 12, N. Y.

We handle hydraulic presses, pumps, and power units of all sizes. Write us your requirements and we will try to help you. We find it impossible to list our equipment in this classified column due to the fact that the equipment is sold before ad is published. For those who seek action look in the New York Times under the Machinery and Tool Column for our regular Sunday Special. Hydraulic Sal-Press, Inc., 336-90 Warren Street, Brooklyn 2, N.Y. MAin 4-7847

FOR SALE: Injection molding machines Lester type. One 2 ounce; ten 4 ounce; one 6 ounce. All in excellent running condition. Reply Box 775, Modern Plastics.

FOR SALE: One ounce IMPCO molding machine complete with molds and loading devices for manufacture of plastic topped tacks. Reply Box 776, Modern Plastics.

FOR SALE: Rubber and Plastic Equipment. Farrel 18" x 45", 16" x 48", and 15" x 36", 3 roll rubber mills. New 6" x 12" Lab. mixing mills and calendars. Other sizes 30" to 60". Royle #2 perfected extruder, and other sizes. 500 ton HPM molding press 42" x 48". 300 ton Field 25" x 30". 200 ton F.B. Hydr. Molding Press 40" x 32". 180 ton F.B. 20" x 20". Francis 175 tons 24" x 18". W.S. 115 ton 24" x 24". 40 ton Broaching Press. Also presses 20 to 500 tons from 12" x 12" to 36" x 36". Record Presses. Hydr. Oil Pumps. Watson Stillman Hor 4 plgr. 1¼" and 2½" x 4" H & L pressure pump. HPM 10 GPM 2700 lbs. Elmes Hor. 4 plgr. 5 and 8 GPM 4500 lbs., and 5500 lbs. Elmes 2" x 6" Horiz. 30 GPM 2500 psi. Ramsey 4½" x 8" vert. triplex 65 GPM 900 lbs. Hydr. Steam Pumps. Low pressure pumps 150 to 600 lbs. Hydr. Accumulators. Stokes Automatic Molding Presses. Stokes & Colton Rotary and Single Punch Tablet Machines ½" to 2". Injection Molding machine 2 oz. to 20 oz. Baker Perkins jacketed mixers 200, 100, 50, 9 and 0.7 gals. capacity. Impregnating units for Lab., Pilot plant and larger sizes. New and used Rotary Cutters. Mikro Pulverizers. Banbury Mixers. Heavy duty mixers, grinders, pulverizers, gas boilers, etc. Partial listing. We buy your surplus machinery. Stein Equipment Co., 99 West St., N. Y. 6, N. Y. WOrth 2-5745.

FOR SALE: Ball & Jewell Cutters #1, #2, #2½. Double Arm Jacketed Mixers 25 gal. to 250 gal. Stokes Rotary 16 punch pellet presses. PERRY EQUIPMENT CORP., 1529 W. Thompson St., Phila., 21, Pa.

FOR SALE: 120 cavity compression mold for ⅞ inch interlocking poker chips, perfect condition; samples furnished on request. Also, 6 oz. Watson-Stillman injection molding machine, 3 Pyrometers, extra parts and nozzles. A-1 operating condition. Ball & Jewell grinder; one plastic material drier. Reply Box 804, Modern Plastics.

FOR SALE: Complete wood flour mill. Capacity 10 tons per 24 hours, using nearby supply of pine and poplar. For further particulars address Box 808, Modern Plastics.

INJECTION MOLDING MACHINE: Reed-Prentice, 4 oz., model 10A, good condition, reasonably priced. Can be seen in my New York warehouse. Alfred A. Rosenthal, 3 Park Row, New York 7, N. Y. REctor 2-2747.

FOR SALE: 2000 ton Baldwin-Southwark Hobbing Press complete with triplex pump motor. Press in excellent condition. Used about three months. Address: J. E. Livingstone Company, 16516 James Couzens Highway, Detroit 21, Michigan.

FOR SALE: Injection presses: 4, 6 and 8 oz. Reeds, 4 and 40 oz. HPM, 6 oz. Grotelite, 3 oz. Munton. 1—Cumberland No. 1½ granulator. Ovens. 1—Leinke Plasti-Hea-Treat Drier. 2—Impco and 1—Meridian Mold. Temp. Circulators. 1—6 vert. drawer Preheat Oven for 4' x 5' Acrylic and Royalite Sheets. 1—300 ton Watson Compress. Press. 2—300 ton HPM Compress press., also other sizes Compress. press. 1—Stokes T preform press. 1—Kux No. 25 rotary Preform press. 1—Naah Rotary Edger. 1—Eclipse 3 HP Gas boiler. 1—Johnstone Score Slitting and Rewind. Machine 52". 1—Sheet Die for No. 2½" NRM, take up and cooling unit. 1—Wilson 37F Air-Forming press. Justin Zenner, 823 W. Waveland Ave., Chicago 13, Ill.

FOR SALE: Fisher Tooth Brush Machines (5), Model 1A, used, reasonable. Reply Box 815, Modern Plastics.

FOR IMMEDIATE DELIVERY
Stokes and Colton 3RP Rotary Tablet Machines.
Mikro 1SH, 2TH & 4TH Pulverizers; Jay Bee, U1 and 3AT, Schutz-O'Neill, Stedman, Rietz Mills.
Fitzpatrick D Comminuter
Baker Perkins & Readco Heavy Duty BB and JNM 50, 100, 150 gal. D.A. Mixers.
Baker Perkins 100-150 gal. Vacuum Mixers.
J. H. Day 75 and 35 gal. Imperial D. A. Jacketed, Sigma Blade Mixers.
Hobart & Read Vertical Mixers, with removable bowls.
Day & Robinson 100 up to 4000 lbs. Dry Powder Mixers.
Package Machy. FA, FA2; Miller and Scandia Auto. Cellophane.
Equipment Is Rebuilt and Guaranteed.
AT TREMENDOUS SAVINGS
UNION STANDARD EQUIPMENT CO., 318-322 Lafayette St., New York 12, N.Y.

PRICED TO SELL
INJECTION MOLDING MACHINES

48-80 IMPCO Injector, '45 used in conjunction with Std. plastic press	$11,500.
22-Oz. REED Mod. 10H, new '46	21,900.
16-Oz. REED Mod. 10E, new '46	Offers
9-Oz. H.P.M. Mod. 200-89, new '39	5,950.
6-Oz. WATSON STILLMAN, new '42	5,500.
6-Oz. LESTER PHOENIX Mod. LPM 2 B	9,500.
4-Oz. REED Type 10-A-4	6,500.
4-Oz. LESTER (7) Mod. IBX & Mod. ML	8,500.
4-Oz. LESTER Mod. 1-V-4, Vertical	4,950.
4-Oz. H.P.M. Type K, Mod. 100-H-4	5,740.
2-Oz. REED, new '37, extras	3,900.
2-Oz. LESTER, Mod. IBX (4)	5,900.
HYD. PLASTIC PRESSES	
700 & 300 Ton D & BOSCHERT	2,950.
200 Ton FARREL 24"x24" platen	1,750.
360 Ton SOUTHWARK rebuilt	2,450.
260 Ton SOUTHWARK Self Contained	Offers
250 Ton H.P.M. 45" St. 14" Ram 36"x32" pl.	2,500.
200 Ton H.P.M. Self Contained	10,000.
100 Ton ADAMSON 12" St. 16"x20" pl	695.
100 Ton FARREL Self Contained	1,950.
75 Ton STANDARD new '46, Vert. & Horiz. Hyd. Strokes	1,975.
75 Ton D & BOSCHERT 9" St.	800.
NEW PLASTIC TRY-OUT SCREW PRESS	1,200.
STOKES Mod. 200D2 & Mod. F.	Offers
PLASTIC SCRAP GRINDERS & MISC.	
BALL & JEWEL #2½, 75 HP.	2,400.
PLASTIC BEAD GRINDER (20)	Offers
PULVERIZER & DISINTEGRATER, 20 HP.	950.
1½ Oz. Plastic NAIL or TACK Heading mch.	Offers
FALES CLICKERS, Style C, new '47	1,250.

EVEREADY CO. E. J. McCallum, Prop. 805 Housatonic Ave., Tel. 4-9471, Bpt. Conn.

Machinery and Equipment WANTED

New Mfr. wants injection molding machines also extruding equipment. Will pay good prices. Reply Box 777, Modern Plastics.

WANTED: Two 2-oz. Reed Prentice injection molding machines. Delivery acceptable within 3 months. PLAST-O-MATIC Corp. 11 Simonds Road, Fitchburg, Massachusetts.

WANTED: 12-oz. Injection Molding Machines, Watson-Stillman or DeMattia EVEREADY CO. 805 Housatonic Ave., Bpt, 4-9471, Conn.

WANTED: Dressing Comb sawing machines: tumbling equipment and supplies. Also a grinder or granulator to handle Screw driver and chisel handles beside Sprues Gates, etc. Reply A. I. I. Mfg. Co., Hartington, Neb.

WANTED: 12 or 16 oz. late type injection molding press. Give complete description etc. Bulow Plastic Co., 8800 Lyndon Ave., Detroit 21, Mich.

Materials Wanted

WANTED: PLASTIC Scrap or Rejects in any form. Acetate Butyrate, Polystyrene, Acrylic, Vinyl Polyethylene, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding, magnetizing and compounding. Reply Box 771, Modern Plastics.

WANTED: PLASTIC SCRAP or REJECTS in any form: Cellulose Acetate, Butyrate, Polyethylene, Polystyrene, Vinyl, Acrylic and Ethyl Cellulose. Reply Box 772, Modern Plastics.

Proprietary Charm, Toy, Prize and Novelty Molder. Will buy your scrap Acetate and Polystyrene injection molding powder or reject parts — and will appreciate getting it, with thanks and immediate cash payment. Samuel Eppy & Co., Inc., 91-15 144th Place, Jamaica 2, N. Y. Phone Axtel 7-2900.

WANTED: Plastic Scrap, Rigid Vinyl, Cellulose Acetate, Polystyrene, Polyethylene, Butyrate, Custom grinding, magnetizing, compounding, and straining of contaminated plastics. Franklin Jeffrey Corporation, 1671 McDonald Avenue, Brooklyn, N. Y. ES 5-7943.

Tupper Corp. will pay top market price for good clean Polyethylene, Polythene, S-Polymer Styrene. Dark or discolored material such as above. Write Mr. John Howzdy, Tupper Corp., Farnumsville, Mass., or phone GRAFTON 481, 482, or 483.

SURPLUS UREA MOLDING POWDER WANTED. Reply Box 818, Modern Plastics.

WANTED: Your Scrap Vinyl, Polyethylene, Polystyrene, Acetate, Ethyl Cellulose, and etc. OFFERING: Reprocessed Granulated Plastic, Custom Grinding, and Straining. Reply Industrial Plastic & Textile Company, 72 Woolsey Street, Irvington, N. J.

WANTED: Cellulose Nitrate scrap. Reply Box 817, Modern Plastics.

(*Continued on page 182*)

Kettles and coils of pure Nickel . . .

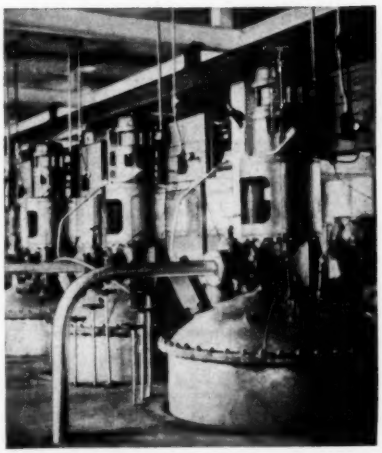
✓ FAST HEAT TRANSFER
✓ LONG LIFE
✓ EASY TO CLEAN

In heat exchange equipment for plastics processing, what qualities do you consider most important?

Good design, of course. Certainly, long life and the promise of low maintenance. But what about the *thermal conductance* of the material of construction? This vital factor will affect speed of processing and fuel costs for the entire life of the apparatus.

Pure Nickel has excellent characteristics for heat exchange equipment handling highly corrosive substances. It offers good thermal conductance combined with outstanding corrosion resistance and high strength. It is easy to fabricate. Welds in Nickel have the same characteristics as Nickel itself. Standard mill forms, including Nickel-Clad Steel simplify many fabrication problems.

"Heat Transfer Through Metallic Walls" is a 20-page treatise giving formulas, charts, and design information of interest to anyone concerned with heat exchange equipment. Write for your copy today.



Pure nickel processing kettles at the Fords, N. J., plant of American Catalin Corporation. The installation consists of 18 nickel kettles used in the manufacture of "Catalin."

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

EMBLEM OF SERVICE
NICKEL INCO ALLOYS
TRADE MARK

MONEL® • "K"® MONEL • "R"® MONEL • "KR"® MONEL • NICKEL • "D"® NICKEL
"L"® NICKEL • INCONEL® • DURANICKEL® • PERMANICKEL® • INCONEL "X"®

AT THE RIGHT PLACE—AT THE RIGHT TIME
WITH THE BARKER & DAVIS AUTOMATIC ROTARY CUT-OFF MACHINE

It is the first of its kind used in plastic and rubber extruding machines. Multiple rotary blades cut through the stock and position for the next cut automatically. It is controlled by timer and solenoid activated single revolution clutch—cuts sheets and tubes cleanly and accurately. It will take any desired length up to 30 ft. It is claimed by users that it speeds up production, eliminating one operator and quickly pays for itself.

The timer or cut-off may be purchased separately if desired. Has ½ H.P. motor—weighs 325 lbs.—Timer weight, 50 lbs.

Write for bulletin sheet.

BARKER-DAVIS MACHINE CO., INC.
LEOMINSTER, MASS.

Stamp Names or Trademarks
ON YOUR PLASTIC PRODUCTS
with the easy-to-use **Kingsley**

Up to 1,000 stampings per hour.

No skilled operators necessary.

Uniform, clean-cut stampings in gold or colors.

Write us about your marking requirements. Enclose a sample or dimensions of part to be stamped. We'll reply air mail with complete details on how a Kingsley Machine can be applied to *your specific need.*

Kingsley STAMPING MACHINE CO.
1806 CAHUENGA BLVD., HOLLYWOOD 28, CALIF.

CLASSIFIED ADVERTISING

(Continued from p. 180)

MATERIALS for SALE

PLEXIGLAS AND LUCITE
New Material, .040, .060, .100, .125, .150, .187, .250, .312, .375, below list price.
No charge for cutting to size.
.250 Gauge Plexiglas, clear, 23¼ x 32", original masking—below list.
.080 Green Plexiglas #240, 19x33x11", Special reduced price.
Other Lucite and Plexiglas from .500 to 1.250. ARISTOCRAT PLASTICS, INC. 55 Clarkson Street, New York 14, N. Y. WAtkins 4-4216

FOR SALE: Cellulose Acetate Extrude Red .070 S flow product of Tennessee Eastman, their formula #807E. Transparent machine wound coils eight to ten pounds each—approximately four thousand pounds Amber, Emerald, Ruby, Blue. Immediate Delivery. EMPIRE HOUSEWARES INC. 2362 Nostrand Ave., Brooklyn, New York—Tel. NAvarre 8-5128.

Bought — Sold
Polyvinyl Chloride
Titanium
Zinc Oxide
Reply Box 819, Modern Plastics

MOLDS Wanted

MOLDS WANTED
Canadian firm would like to buy or lease on royalty basis, American molds for toys, new gadgets, household articles, advertising novelties, hardware or electrical appliances. We must be able to fit molds to a three or four ounce injection machine. Send details, costs and samples or pictures. Reply Tomshkill Products, 1555 Crawford Ave., Windsor, Ont. Canada.

WANTED
TOOTHBRUSH MOLD AND MACHINE
Molder wishes to enter child's toothbrush field and requires mold, also Fisher Machine model #1A together with cams for toothbrush. Molded Industrial Plastics, Inc., 150-45 Twelfth Ave., Whitestone, L. I.

WANTED USED MOLD: in good condition for a 7½" to 9" ladies' dressing comb with fancy back, suitable for 6 oz. Reed-Prentice. Reply, with one sample included to Box 811, Modern Plastics.

HELP Wanted

WANTED for injection molding plant in the New England area: Engineer with mold manufacture and general thermoplastic production experience. State full particulars. Reply Box 773, Modern Plastics.

SALES REPRESENTATIVES: Established Pacific Coast Manufacturer of Transparent Acetate Boxes, Suitable for Packaging of Candy, Nuts, Dried Fruit, Cakes, Gift Ware, etc., offers Attractive Commission Arrangement for Live Wire Salesmen Now Calling on Manufacturers and Packers of these commodities in All Western States. Write giving full particulars and territory desired. PLASTI-PAK PRODUCTS, 590 York St., San Francisco 10, Calif.

WANTED:— Assistant Molding Supervisor for large injection molding plant located in the New England area. State experience, age, education. Reply Box 774 Modern Plastics.

NEEDED. Young experienced aggressive man to head new proprietary product division of established, moderate sized injection firm. Reply, stating all qualifications and salary requirements to Box 809, Modern Plastics.

Situations Wanted

LAMINATION, EXTRUSION, COATING. Production and development. Experienced as technical director in both electrical and chemical fields. Textiles, papers, films and flexible metals industrial and defense packaging materials and products including pipe and thin polyethylene film. Inorganic and organic resins and rubbers. Can be available for two days per week on permanent basis. Reply Box 778, Modern Plastics.

MECHANICAL DRAFTSMAN AND DESIGNER: Married, age 48, desires position or represent a plastics concern in the Chicago area or what have you to offer. Have 15 years experience in the mechanical field and 3 years of plastics injection molding experience. Will explain fully by letter, salary not important. Reply Box 801 Modern Plastics.

EXTRUSION & INJECTION PLANT MANAGER with ten years' experience desires position with progressive company. Capable of assuming full responsibility. Full knowledge of extrusion and injection production problems, dies and mold design, estimating, design, quality control and production planning experience. Best references. Will relocate. Reply Box 806, Modern Plastics.

VINYL TECHNICAL MANAGER, Age 35. Film, sheet, extrusions, coated fabrics. Executive with leading converter and distributor. Thoroughly acquainted with entire Vinyl Industry. Development; Quality Control; built and maintained laboratory; specifications; fabrication; printing; coating; laminating; trouble shooting; technical sales liaison; direct contact with customers. Committee Member S.P.I. Listed "Who's Who In Plastics". Locate New York or vicinity. Reply Box 807, Modern Plastics.

PLASTICS ENGINEER: presently employed as assistant manager of plastics molding plant desires to make a change for personal reasons. Age 31, married. B.S. Engineering, 5 years' practical experience in direct supervision of compression, transfer, injection molding and finishing operations. Am production minded and cost conscious. Member SPE. Can supply excellent references. Will relocate. Reply Box 813, Modern Plastics.

PRACTICAL PLASTIC MAN, age 39 with 20 years' experience on the job manufacturing, desires to contact two or three parties interested in setting up small compression or injection molding plant. (Preferably in Western Ohio). Might consider buying into small plastic company. References gladly furnished. Reply Box 816, Modern Plastics.

Miscellaneous

FOREIGN MANUFACTURERS of plastic articles, interested in all phases of plastic production, or in new applications, or in suggestions for new and interesting plastic products, also patented products whose manufacturing rights they wish to obtain under a licensing agreement, may write for full details. Also in French, German or Spanish, to Box 810, Modern Plastics.

DO YOU NEED
NEW IDEAS NEW PRODUCTS
NEW BUSINESS NEW MONEY
DO YOU WANT
TO SELL YOUR COMPANY
Executive with extensive background in plastics industry and New Product Development desires to buy 50 or 100% interest in small or medium sized established plastics concern in the East. Perhaps we can serve each other. Reply Box 812, Modern Plastics.

PLANT FOR SALE. Well equipped plastic custom molding shop in Southern New England. 8 compression—2 injection presses various sizes. Established business, good operators, new building 10 year lease. Reply Box 800, Modern Plastics.

BUTTON MOLDING PLANT WANTED: Complete set of Presses, Molds, Tabletting and Punching Machines required. State fullest details such as, Make, Model, Condition and Prices, include itemized accessory list, also Samples. Box 802, Modern Plastics.

ATTENTION MANUFACTURERS:
We'll pay top price for your surplus *new corrugated cartons.* Don't let them deteriorate. *Cash in now.* No quantity too large. Send samples and advise quantities available. E. WERTHEIMER & CO. 5522 W. Division, Chicago 51, Ill. Phone Estebrook 8-8532
References: Your Own Bank or Dun & Bradstreet

LINES WANTED: New York sales representative, covering major 5¢ to $1.00 Chain Stores, desires to contact stock molders of plastic items, housewares, toys, notions, novelties, etc. Have over 20 years' experience in marketing plastic items to the big Syndicates, and can produce volume sales. Quick action commission basis. Box 805, Modern Plastics.

WILL BUY your dirty THINNERS and SOLVENTS. Send sample or letter giving approximate contents and solids. The Johann Company, Room 416, 1180 E. 63rd St., Chicago, Ill.

I WANT TO REPRESENT YOU from New York City to Wash. D.C. Have sold toys, novelties and housewares to every source of distribution. Especially desire West Coast and Midwest, South and Southwest manufacturers to make inquiries to P. O. Box 275, New York 3, N. Y.

FOR SALE: 3 molds for plastic picture frames. Attractive modern designs. Expensive engraving. Reply Box 803, Modern Plastics.

WANTED for cash, large quantities of plastic soap boxes. DEPARTMENT SALES CO., 865 Broadway, New York City.

HAVE YOU A GIFT OR HOUSEWARE PRODUCT OR IDEA THAT NEEDS PROMOTING? Let us do for you what we have done for others. We will carry stock and merchandise your product in our successfully proven way through our nationwide sales outlets. Or we will help you put your idea into reality. Reply Box 820, Modern Plastics.

All classified advertisements payable in advance of publication

Up to 60 words $7.50	Up to 120 words $15.00	Up to 180 words $22.50
Up to 60 words (boxed) $15.00	Up to 120 words (boxed) .. $30.00	Up to 180 words (boxed) ... $45.00

For further information address Classified Advertising Department, Modern Plastics, 122 E. 42nd St., N. Y. 17, N. Y.

Controlled

OPERATING TEMPERATURES TO 650° F

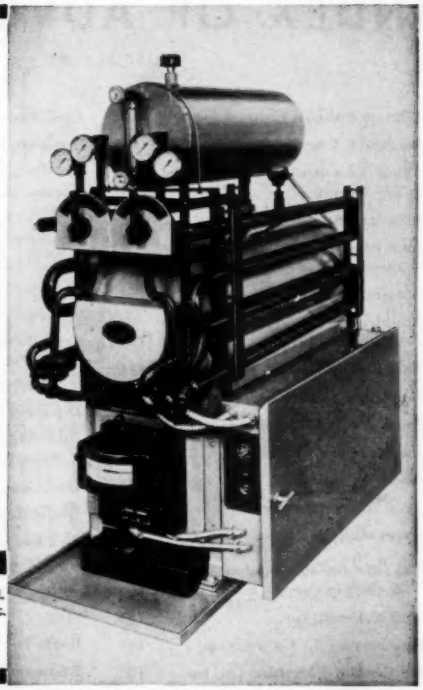
The Royle Temperature Control Unit is designed to eliminate uncertainty in extrusion and other industrial processes which require accurate and constantly maintained operating temperatures of extended periods of time. This compact and simply operated unit will supply—or drain—heat in accordance with process specifications as established by laboratory experiments. Features are built into the self-contained Royle Temperature Control Unit to assure maximum results with a minimum of maintenance.

WRITE FOR COMPLETE DETAILS

JOHN ROYLE & SONS ROYLE PATERSON N. J. 1880

PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

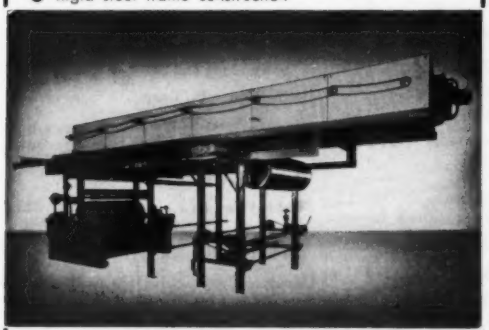
London, England	Home Office	Akron, Ohio	Los Angeles, Cal.
James Day (Machinery) Ltd.	E. B. Trout	J. W. VanRiper	J. C. Clinefelter	H. M. Royal, Inc.
REgent 2430	SHerwood 2-8262	JEfferson 3264	LOgan 3261



TWO COLOR LEMBO

vinyl printing machine

- For vinyl and other plastic films
- Available in one to four color models, too
- Fully adjustable—accurate register
- Widths up to 120"
- Repeats pattern from 14" to 72", larger on order
- Rigid steel frame construction



Write for our new illustrated brochure

LEMBO machine works, inc.

248 East 17th St. **Paterson 4, N. J.**

Manufacturers of Printing Presses and Cylinders

Filler of Strength!

SOLKA-FLOC fibres are tough. And when used as a filler they enable production of plastics with as much as *twice the strength* obtainable with wood flour. *Light color, heat stability, improved wear* and *electrical strength* are other properties your plastic parts can frequently obtain when SOLKA-FLOC is used.

Find out more about the use of SOLKA-FLOC in plastics. Write today for information and samples.

SOLKA-FLOC®

A PRODUCT OF QUALITY BROWN *Company*

Berlin, NEW HAMPSHIRE

GENERAL SALES OFFICES: 500 FIFTH AVENUE, NEW YORK 18, N. Y.

Branch Sales Offices:

Portland, Me., Boston, Chicago, St. Louis, San Francisco, Montreal

SOLKA & CELLATE PULPS · SOLKA-FLOC · NIBROC PAPERS · NIBROC TOWELS · NIBROC KOWTOWLS · BERMICO SEWER PIPE, CONDUIT & CORES · ONCO INSOLES · CHEMICALS

INDEX OF ADVERTISERS

JANUARY 1951

Acheson Colloids Corporation ... 153
Aeromark Company, The 164
Allied Chemical & Dye Corp., The Barrett Div. 107
American Anode Inc. 103
American Cyanamid Company, Plastics Department 88, 89
American Insulator Corp. 54
American Molding Powder & Chemical Corp. 159
American Polymer Corporation.. 130
American Screw Co. 105
Amos Molded Plastics 20
Anderson Bros. Mfg. Co. 162
Apex Machine Mfg. Corp. 147
Atlas Valve Company 186
Avery Adhesive Label Corp. 12

Bakelite Division, Union Carbide & Carbon Corp..Inside Back Cover
Ball & Jewell, Inc. 159
Bamberger, A., Corporation 147
Barker-Davis Machine Co., Inc. .. 181
Barrett Division, The, Allied Chemical & Dye Corp. 107
Beel Engineering Co. 164
Bethlehem Steel Company 22
Black-Clawson Co., The, Div. of Dilts Machine Works 187
Blake & Johnson Co., The 105
Boonton Molding Co. 26
Borden Company, The, Chemical Division 135
Bridgeport Moulded Products, Inc. 8
Brown Company 183
Buttondex Corp. 158

Cabot, Godfrey L., Inc. 145
Cambridge Instrument Co., Inc. . 144
Camcar Screw & Mfg. Corp. 105
Carborundum Company, The ... 33
Carpenter Steel Co., The 131
Carver, Fred S. Inc. 160
Catalin Corporation of America . 1
Celanese Corporation of America, Plastics Division 9
Central Screw Co. 105
Chicago Molded Products Corp. . 4
Claremont Waste Mfg. Company . 175
Classified 180, 182
Columbia Protektosite Company 52
Conforming Matrix Corporation 163
Connecticut Plastic Products Co., Inc. 167
Continental Can Company, Plastics Div. 121
Continental Screw Co. 105
Crucible Steel Company of America, Tool Steel Division 49
Cruver Manufacturing Co. 24
Crystal Plastics, Inc. 140
Cumberland Engineering Company Inc. 27

Diamond Metal Products Co. ... 153
Dilts Machine Works Div., The Black-Clawson Co. 187
Dow Chemical Company, The ... 169
Drakenfeld, B. F., & Co., Inc. ... 171
du Pont de Nemours, E. I. & Co. (Inc.) Polychemicals Dept. ... 7
Durex Plastics & Chemicals, Inc. ..... Inside Front Cover

Eagle Tool & Machine Company . 143
Eastman Kodak Company, Cellulose Products Division 127
Elco Tool & Screw Corp. 105
Electric Auto-Lite Company, The 117
Erie Engine & Mfg. Co. 175
Erie Resistor Corp. 44

Fabricon Products, Inc., Plastics Division 142
Farrel-Birmingham Company, Inc. 93
Fellows Gear Shaper Co., The ... 53
Ferro Chemical Corporation 137
Ferro Enamel Corporation 19
Flexfirm Products 133
Formica Co., The 112, 113
Franklin Jeffrey Corporation ... 173
French Oil Mill Machinery Co., The 186

General Electric Company .....Back Cover
General Industries Co., The 115
Gering Products, Inc. 43, 151
Goodrich, B. F., Chemical Co., The 3
Goodyear Tire & Rubber Co., The, Chemical Division 23, 109
Great Lakes Screw Corp. 105

Hardesty Chemical Co., Inc. 143
Harper, H. M. Co., The 105
Hawley Products Company 161
Hercules Powder Company ... 35, 165
Heyden Chemical Corporation .. 123
Hinde & Dauch Paper Co., The .. 29
Hobbs Manufacturing Co. 179
Hommel, O., Company, The 179
Hyatt Award, The John Wesley .. 39
Hydraulic Press Mfg. Co., The . 46, 47

Improved Paper Machinery Corporation 171
Industrial Heater Co., Inc. 157
Industrial Research Laboratories, Ltd. 128
International Nickel Company, Inc., The 181

Jamison, H., Plastics 167
Jeffrey, Franklin Corporation ... 173
Jones, C. Walker, Co. 177

Kentucky Color & Chemical Co., Inc. 154
Kingsley Stamping Machine Co. 181
Koppers Company, Inc. 51
Kurz-Kasch, Incorporated 17

Lane, J. H. & Co., Inc. 157
Lembo Machine Works, Inc. 183
Lester-Phoenix, Inc. 34

MacRay Engineering Co. 134
Mallory, P. R., Plastics, Inc. 141
Manco Products Co. 147
Marblette Corporation 96
Marvel Engineering Company ... 138
Mearl Corporation, The 128
Meyercord Co., The 154
Michigan Chrome & Chemical Company 158
Michigan Molded Plastics, Inc. .. 132
Midland Die & Engraving Company 80
Mills, Elmer E., Corp. 37
Mitts & Merrill 177
Modern Plastic Machinery Corp. . 13
Molded Products Corporation ... 38
Molded Resin Fiber Co. 114
Monsanto Chemical Company, Plastics Division 31
Mosinee Paper Mills Company .. 99
Moslo Machinery Company 138
Muehlstein, H., & Co., Inc. 163

National Lead Company 36
National Lock Co. 105
National Rubber Machinery Co. . 30

(Continued on page 186)

IF IT'S PLASTIC

Sell it in

Plastics Merchandising

THE RETAILER'S MONTHLY — NEW WAYS TO ADDED SALES...WITH PLASTICS

FIRST ISSUE JANUARY 1951

FIRST AND ONLY MEDIUM TO DO ENTIRE JOB OF SELLING PLASTICS PRODUCTS AT RETAIL LEVEL

UNMATCHED PURCHASING POWER OF 55,000 SELECTED BUYERS

Each Reader a Plastics Buyer in an Important Retail Outlet

Merchandise Manager
Housewares Buyer
Toy Buyer
Hardware Buyer
Drapery and Curtain Buyer
Sporting Goods Buyer
Auto Accessories Buyer
Furniture Buyer
Luggage and Leather Goods Buyer
Notions and Novelty Buyer
Cosmetics Buyer
Rainwear Buyer
Infants and Nursery Accessories Buyer
Stationery Buyer
Religious Goods Buyer
Closet Shop Buyer
Floor Covering Buyer
Radio and Musical Instrument Buyer

Department Stores
Mail Order Houses
Variety Chains
Buying Syndicates
Drug Chains
Hardware and Sporting Goods Chains
Auto Accessories Chains
Jewelry, Stationery Chains
Specialty Department Stores
Luggage & Leather Goods Chains
Furniture Chains
Tobacco Chains
Independent Hardware Stores
Independent Toy Stores
Independent Drug Stores
General Merchandise Stores
Independent Furniture Stores
Floor Covering and Drapery Stores

Editorial Content Survey-Tested; Aimed For Sales

Three-way editorial pattern is cut to buyers' needs as checked by detailed surveys in Chicago, Detroit, New York, Boston and other leading retail centers.

NEW PLASTICS PRODUCTS
Complete buying data in capsule form of every new plastic product with all the facts a buyer needs to act: photos, descriptions, sizes, deliveries, quantities, selling aids, sources.

NEW PLASTICS PROMOTIONS
Spot news of outstanding retail plastics promotions telling exactly how each one was worked, as reported by 30-editor network in key U.S. retail centers.

MORE PROFITS WITH PLASTICS
Invaluable merchandising suggestions. What to promote and when. Sales training aids. How to display and advertise plastics products for volume sales.

Tabloid Format; Coated Stock; Four-Color Forms

Trim size, 10⅞ x 14⅜. Handles conveniently. Sparkling 110 screen halftones. Advertising adjoins editorial. 4-column make-up provides attractive text and picture arrangements, permits use of standard size advertisements.

EXPERIENCED HIGHLY SUCCESSFUL PUBLISHING BACKGROUND

Plastics Merchandising... a Breskin Publication, is backed by the specialized technical and merchandising knowledge developed through the success of

Modern Plastics
25 years

Modern Packaging
23 years

Modern Plastics Encyclopedia
11 years

Modern Packaging Encyclopedia
15 years

DISTRIBUTION PLAN PINPOINTS READERS THAT BUY IN VOLUME

Selective planning of controlled circulation (55,000 guaranteed) does the job three ways:

1. REACHES *OUT* TO BIGGEST MARKETS. Distribution is aimed across-the-board to the specific retail outlets where plastics are marketed in volume.

2. REACHES *UP* TO SPECIFIC SALES DEPARTMENTS. Within each type of retail establishment, circulation is directed only to the departments that handle plastics products.

3. REACHES *IN* TO EACH PLASTICS BUYER. In each retail department, PLASTICS MERCHANDISING is delivered to the one top buying authority. Result: a 55,000 "all-prospect" circulation that's unmatched anywhere else.

WRITE FOR FREE FIRST ISSUE FULL DETAILS

You'll want to examine the only merchandising publication that's geared to sell finished plastics — and plastics only. Write today for your *free* copy of the first regular issue — due off press on January 5th. Along with it we will send details about the market, rates, circulation and mechanical requirements. Mail your request today to

PLASTICS MERCHANDISING, INC.
A Unit of BRESKIN PUBLICATIONS
122 East 42nd Street • New York 17, N. Y.

SEE SRDS LISTING IN CLASSIFICATION 114

ADVERTISERS' INDEX

(*Continued from page 184*)

New Hermes, Inc. 148
Newark Die Company 138
Nixon Nitration Works 21
Northern Industrial Chemical Co. 162
Norton Laboratories, Inc. 129

Parker-Kalon Corporation . . . 18, 105
Parker Stamp Works, Inc., The . . 152
Pheoll Manufacturing Co. 105
Phillips Screws 105
Plaskon Div., Libbey-Owens-Ford Glass Co. 83
Plastic Molding Corporation 171
Plastics Engineering Co. 45
Plastics Merchandising, Inc. 101, 185
Premier Thermo-Plastics Co. 139
Progressive Machine Co., Inc. . . . 140
Pyro Plastics Corporation 50

Quaker Oats Company, The 16
Quinn-Berry Corp. 42

Recto Molded Products, Inc. 166
Reed-Prentice Corp. 11
Reichhold Chemicals, Inc. 111
Richardson Company, The 6
Rockford Screw Products Co. 105
Rogers Corporation 25
Royle, John & Sons 183

Santay Corporation 48
Schulman, A., Inc. 166
Schwartz Chemical Co., Inc. 160
Scoville Manufacturing Co. 105
Shakeproof Inc. 105
Sillcocks-Miller Company, The . . 143
Sinko Manufacturing & Tool Co. 173
Southington Hdwe. Mfg. Co. 105
Standard Tool Co. 142
Stanley Chemical Company 146
Sterling Electric Motors 132
Stokes, F. J., Machine Company 136
Stricker-Brunhuber Corp. 153

Tennessee Eastman Company . . . 91
Thermo Electric Co., Inc. 175
Timken Roller Bearing Company, The 149
Titanium Pigment Corporation . . 32
Tupper Corporation 28

Union Carbide & Carbon Corporation, Bakelite Division . . . . . Inside Back Cover

Van Dorn Iron Works Co., The . . 125
Victory Manufacturing Company 179

Wales-Beech Corporation 105
Waterbury Companies Inc. 150
Watlow Electric Manufacturing Co. 163
Watson-Stillman Co., The 14, 15
Welding Engineers, Inc. 119
Westchester Plastics Inc. 10
Western Felt Works 144
White, S. S., Dental Mfg. Co. 177
Windsor, R. H., Ltd. 40, 41
Wood, R. D., Company 173
Worcester Moulded Plastics Co. . 188

Yardley Plastics Co. 144

MODERN PLASTICS

122 EAST 42nd STREET • NEW YORK 17, N.Y.

WILL WE HAVE PEACE IN 1951?

We hope so, of course. But, in peace or in war, plastics plants will continue to demand this

ATLAS Type "E"

High Pressure Reducing Valve

on which the leading plastics plants of the world are now dependent for most economical reduction of high pressures. Type "E" handles air, water, or oil, up to 6,000 lb. per sq. in., *without shock*. Remember, Type "E" is backed by a concern that has specialized in regulating valves *exclusively* for more than a half century.

Indeed, It's Well Built

Each detail is modern in every respect. Bar steel body. Internal metal parts are specially protected. A formed packing of special material superior to leather is used which is immune to all fluids commonly used in hydraulic machinery. The pressure on the seat is balanced by a piston with the result that variations in high initial pressure have little effect on the reduced pressure.

Check the list below and mail to us with your name, firm name and address.

ATLAS VALVE COMPANY

REGULATING VALVES FOR EVERY SERVICE

277 South St., Newark 5, N. J.

Represented in Principal Cities

☐ Please send complete information on the ATLAS Type "E" Regulating Valve. Also please send information on the following ATLAS products—

☐ Damper Regulators
☐ Temperature Regulators
☐ Reducing Valves
☐ Exhaust Control Systems
☐ CAMPBELL Boiler Feed Water Regulators
☐ Pump Governors
☐ Oil Control Cocks
☐ Humidity Controllers
☐ Thermostats
☐ Balanced Valves
☐ Control Valves

FRENCH HYDRAULIC PRESSES

. . . in sizes up to 1,500 tons, are standard equipment in the plastic industry.

Write for our catalog

THE FRENCH OIL MILL MACHINERY CO.

(HYDRAULIC PRESS DIVISION)

PIQUA, OHIO U.S.A.

HELPFUL BOOKLETS FREE!

MOLD MAKERS' SUPPLIES. Latest supplementary catalog listing tools, supplies, and other items used in making molds. Includes price list. 24 pages. Detroit Mold Engineering Co. **(1-804)**

SURFACE PYROMETERS. Described are various standard, combination, and special models of Cambridge Pyrometers. 12 pages, plus price list. Cambridge Instrument Co., Inc. **(1-807)**

TETRAFLUOROETHYLENE RESIN SUSPENSOIDS. Eight-page bulletin summarizing the uses, properties, formulation, and methods of processing stable aqueous dispersions of "Teflon." Polychemicals Dept., E. I. du Pont de Nemours & Co., Inc. **(1-812)**

BAND SAW TIRES. Described are Carter's "Jiffy-Tires"—for band saw wheels. Includes mounting instructions. Carter Products Co. **(1-821)**

PARTS MARKING MACHINES. Illustrations and features of various Acromark parts marking machines are given. Three other machines for use in stamping are also presented. 6 pages. The Acromark Co. **(1-829)**

VINYL PRINTING INKS. An explanation of why ghosting or mark-off occurs in vinyl printing, with a discussion of how to prevent this trouble. Atlas Coatings Corp. **(1-832)**

Any of the booklets described here plus many others—forty-four in all—are available for the asking, without charge or obligation.

Just turn to the Manufacturers' Literature page in this issue (it's printed on heavy colored paper), circle the numbers corresponding to the booklets you want, fill in the reply postcard, and mail. No postage needed.

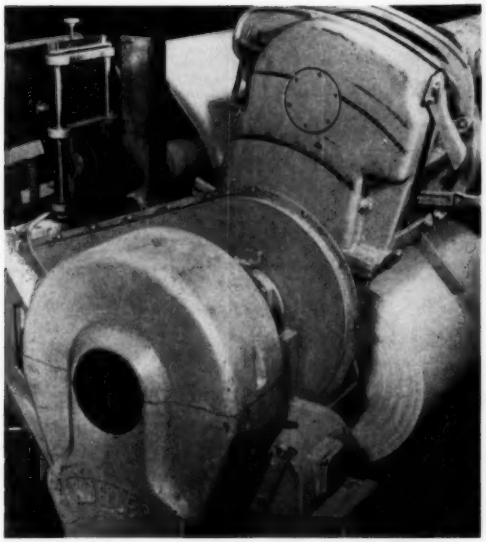
We'll see that you get the literature you request promptly.

A SERVICE OF

MODERN PLASTICS

A BRESKIN PUBLICATION

122 East 42nd Street, New York 17, N. Y.



New Kohler System Plastic Winder

• Here it is, a new plastic winder—by Dilts—that may exactly meet your requirements.

One by one, check and consider the following operational features and time and money saving advantages:

1. Center winder.
2. Controlled tension.
3. Roll change at full web speed.
4. No waste on strike-in.
5. For film and sheeting.
6. Slitting for trim or narrow rolls continuous. Trim slitting uninterrupted.
7. Adjustable size roll slitting.
8. Controlled length of roll-metered.

With this new plastic winder you could (1) increase production, (2) decrease waste, (3) form better rolls, (4) save money.

Contact us. See it yourself.

Dilts Machine Works

FULTON, NEW YORK

SHARTLE BROS. MACHINE CO., MIDDLETOWN, OHIO
Divisions of THE BLACK-CLAWSON CO., HAMILTON, OHIO
Western Sales Office: Mayer Building, Portland, Oregon
Southern Sales Office: 937 Coventry Road, Decatur, Georgia
Associate: ALEXANDER FLECK LIMITED, Ottawa, Canada
Subsidiary: B-C International, Ltd., Greener House, 66/68 Haymarket, London, S.W.1, England

KOHLER SYSTEM EQUIPMENT • PRODUCT OF DILTS

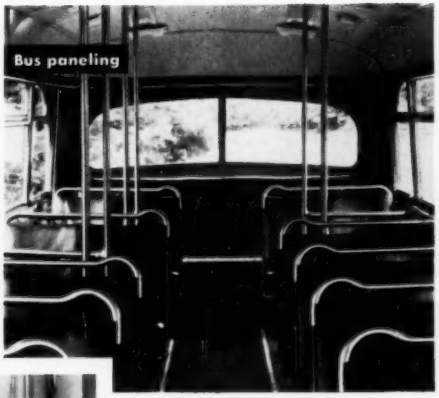
One Good Name (Such as YOURS) Deserves Another —

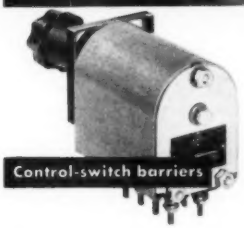
WMP

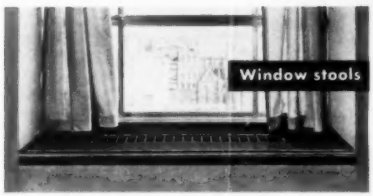
The same care you take when you select materials to go into your product should be exercised in the selection of a custom injection moulder. To match their own reputation for quality work, manufacturers all over the nation rely closely and many times exclusively on Worcester Moulded Plastics Co. Because our sole business is the moulding of plastic parts and products for others, we do our utmost, plastically speaking, to stamp your product with the trade-mark of WMP quality.

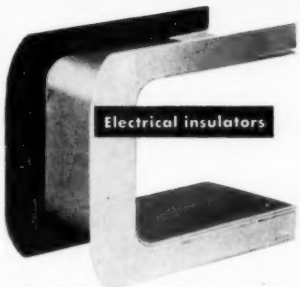
Planning a new plastics addition to your family of products? Let us keep your reputation for quality well moulded.

14 HYGEIA STREET
WORCESTER 8, MASS.
17 East 42nd St., New York 17, N. Y.









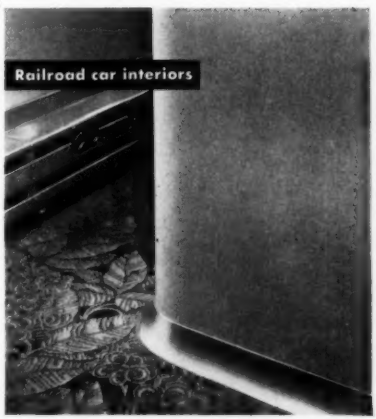
Form Your Plans Now with POSTFORMED Plastic Laminates..

... Postformed plastic laminates made with BAKELITE Phenolic Resins—in both decorative and industrial types—are bringing economies and functional improvements to thousands of products and product parts. Industries they have helped include aircraft, automotive, textile, transportation, communications, and furniture.

Light in weight and inexpensive to fabricate, they are readily machined by standard methods. Depending on the types of laminates and their thicknesses, they can be formed to small radii. Once formed, these materials strongly resist denting. They have the mechanical strength to withstand vibration and rough handling. In electrical equipment, they provide electrical resistance. By combining mechanical and electrical functions, postformed laminates often eliminate costly assembly operations.

Shaped into single-unit counter tops and backs for kitchen cabinets and sinks, they overcome the problem of unsealed cracks that harbor dirt and moisture. Postformed corner panels in railroad cars promote safety and are easy to clean. There are hundreds upon hundreds of applications where postformed BAKELITE Phenolic plastic laminates have stepped up production and cut costs while upgrading products. Why not let us show how they can serve you? Write Dept. BM-13.

Illustrations courtesy of Formica Company.



WHAT ARE POSTFORMED LAMINATES?

Selected paper stocks, fabrics, or fibrous materials are impregnated with BAKELITE Phenolic Resin Varnishes. By means of heat and pressure they are converted into rigid, homogeneous, thermoset laminated sheets. These sheets have sufficient residual elasticity so that they can be *postformed* by reheating until they become pliable, after which they are drawn or bent over simple jigs and fixtures. Upon cooling they permanently harden into the new shapes.

Bakelite TRADE-MARK *Phenolic* LAMINATING VARNISHES

BAKELITE DIVISION UCC

BAKELITE DIVISION

Union Carbide and Carbon Corporation

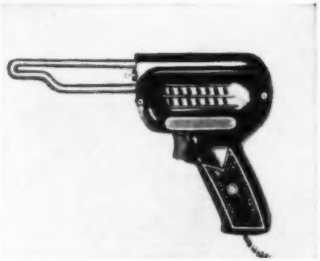
30 East 42nd Street, New York 17, N. Y.

You get 6 extra benefits

PLUS SHOCK RESISTANCE WITH G-E RUBBER-PHENOLICS

1. Reduce finishing costs—Easy flash removal of wood flour-filled G-E rubber-phenolics eliminates expensive hand finishing usually required by impact materials.

2. Reduce breakage of parts in handling—Breakage during shipping, handling and assembling fragile parts is minimized with shock-resistant G-E rubber-phenolics.

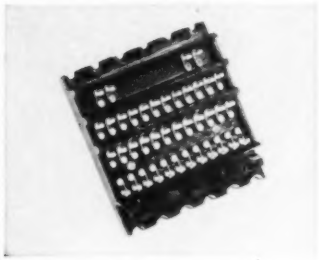


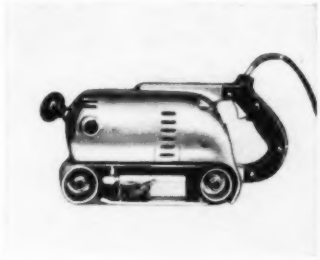
3. Improve appearance—Tough G-E wood flour-filled rubber-phenolic parts have good appearance and may be used in molds designed for general-purpose compounds.

4. Minimize cracking around inserts—Large metal inserts may be molded or press-fitted in thin-walled parts without excessive cracking when you use resilient G-E rubber-phenolics.

5. Extend service life—G-E rubber-phenolic parts offer additional safety factor because they often remain operative after initial cracking.

6. Withstand vibration and fatigue—The outstanding shock, vibration and fatigue resistance of G-E rubber-phenolics means sturdy, resilient parts that can "take it."





There's a whole family of G-E rubber-phenolics to choose from, with wood flour, asbestos, flock or fabric fillers to impart the impact and heat resistance required. The wood flour-filled types can be preformed and molded like general-purpose phenolics, but have five times their shock resistance. Why not check your jobs requiring shock resistance and prove to yourself that G-E rubber-phenolics may improve your products or reduce your costs? Remember, new markets are now available to you because these compounds work successfully in applications which "stump" other materials.

Write us today for more details on this versatile family of shock-resistant compounds. We'll send you experimental samples and detailed data sheets. Address: Section D4, Chemical Department, General Electric Company, Pittsfield, Mass.

You can put your confidence in

GENERAL ELECTRIC